

## On the Japanese Species of *Bryaxis* (Coleoptera: Staphylinidae: Pselaphinae), with Notes on Allied Genera and on Endoskeletal Polymorphism

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The *Bryaxis* of Japan are revised, and a key to the species is provided. The species definitions are largely based on male sexual characters, but the female genital plates appear also to provide robust characters. Presently, 34 Japanese species of *Bryaxis* are recognized, 21 of them being described as new: *B. bushido* sp. n., *B. heian* sp. n., *B. hisamatsui* sp. n., *B. hoko* sp. n., *B. iriomotensis* sp. n., *B. jomon* sp. n., *B. kamakura* sp. n., *B. karate* sp. n., *B. katana* sp. n., *B. kofun* sp. n., *B. mayumi* sp. n., *B. naginata* sp. n., *B. peckorum* sp. n., *B. platalea* sp. n., *B. samurai* sp. n., *B. sawadai* sp. n., *B. sumo* sp. n., *B. tanto* sp. n., *B. taradakensis* sp. n., *B. tetralobus* sp. n., and *B. yari* sp. n. The following names are synonymized: *Bythoxenites diversicornis* Löbl and Kurbatov with *Bt. sulcithorax* Tanokuchi, *Bryaxis brevipalpis* Jeannel with *B. japonicus* (Sharp), *Bryaxis kintaro* Nomura and *B. kintaro odaiensis* Nomura with *B. koltzei* (Reitter). Lectotypes are designated for *Bryaxis harmandi* Raffray, *B. sauteri* Raffray, *B. humilis* Raffray, *B. japonicus* (Sharp), and *B. reversus* (Sharp). *Bryaxis subseriatus* (Weise) and *B. grandicollis* Jeannel are considered *species inquirendae*. Sexual polymorphism is discussed, and polymorphism affecting endoskeletal structures is described in male *B. reversus*.

**Key Words:** Coleoptera, Staphylinidae, Pselaphinae, *Bryaxis*, taxonomy, Japan, polymorphism.

### Introduction

Three genera of Bythinini are represented in Japan. *Tychobythinus* Ganglbauer with three species (two of which are unnamed) and *Bythoxenites* Jeannel with nine species were treated by Löbl and Kurbatov (1996a). Nomura (1996) recorded from Japan an additional species of *Tychobythinus*, *T. aino* Kurbatov, 1992, previously known from the Kurile Islands (Kurbatov 1992). Three previously described species of *Bythoxenites* (Tanokuchi 1990) were overlooked by Löbl and Kurbatov (1996a). The type material of the species described by Tanokuchi could not be examined. However, their detailed descriptions appear adequate for reliable identification.

The third genus of Bythinini occurring in Japan is *Bryaxis* Kugelann. Jeannel (1958) treated 13 Japanese species, six of which he described as new. The type material of two of these species, *B. subseriatus* Weise, 1877 and *B. grandicollis* Jeannel, 1958, is lost or untraceable. In the absence of detailed information, they cannot be adequately treated within the present study and are placed as *species inquirendae*. Nomura (1995) described an additional Japanese species and subspecies, *B. kintaro*

*kintaro* and *B. kintaro odaiensis*, and he also recorded *B. extremalis* Kurbatov, 1990 from Japan (Nomura 1996). Kurbatov (1994) provided a review of the *Bryaxis* species from Far East Russia in which he recorded *B. japonicus* (Sharp) and *B. humilis* Raffray, previously known from Japan only. The species treated by Kurbatov and Nomura are the only ones which can be identified without examination of the relevant type material. Thus, of the eight species recorded by Nomura (1996) from the Abukuma Hills in eastern Honshu, only three were named.

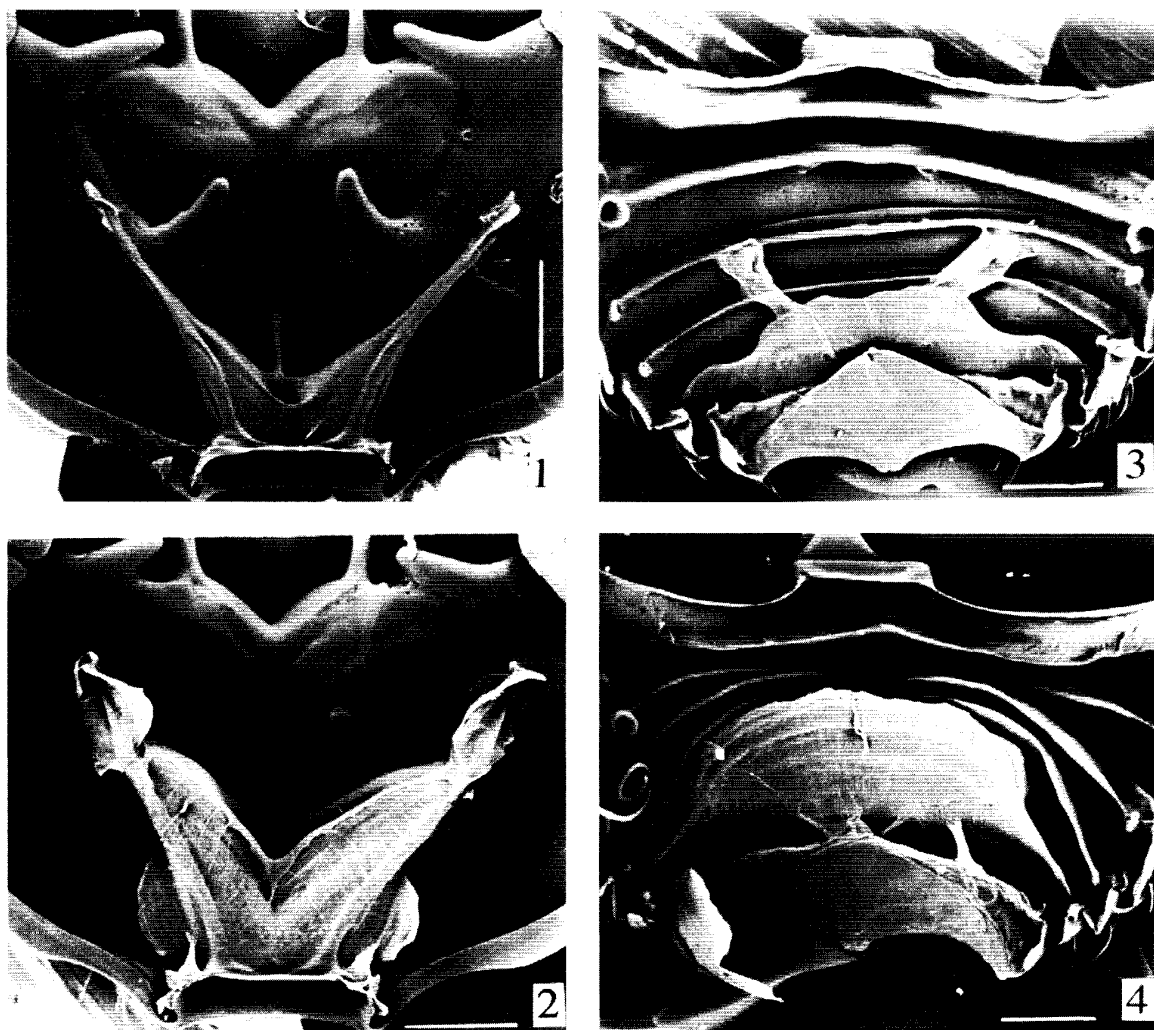
*Bryaxis* is certainly one of the largest pselaphine genera. Although some members are widely distributed, many appear to have small ranges and are restricted to higher elevations (Löbl and Kurbatov 1996b). The genus is thus potentially interesting for biogeographical studies.

The present paper intends to provide a more sound basis for the taxonomy of the Japanese *Bryaxis*. Six species are redescribed on the basis of their holotypes and the lectotypes are newly designated for five species each based on single type specimen in this study. Twenty-one species are newly described and three new synonyms are presented. Despite obviously incomplete research as far as the number of taxa and their distribution are concerned, the number of known Japanese species has reached 34 as a result. This number will likely increase as suggested by the fact that eight species of *Bryaxis* were found in Ishizuchi National Park, Shikoku, in a few days of field work.

One of the general problems in taxonomy is the recognition of polymorphism and intraspecific variation. Hind wing polymorphism is a common feature among insects (Thayer 1992) and was observed in East Asian *Bryaxis* (Kurbatov 1994). Females of *Bryaxis* are generally apterous or micropterous, including in wide-spread species, e.g., the European *B. bulbifer* (Reichenbach, 1816) and *B. curtisi* (Leach, 1817). The state of the wings in males varies from apterism to macroptery, depending on species, and may vary in a single species, such as *B. koltzei* (Reitter, 1887) (Kurbatov 1994). Nomura (1991) found a similar situation within the Batrisini. The size of the eyes and the size or the presence of humeral protuberances are generally correlated with the state of the metathoracic wings.

A second type of polymorphism appears to be restricted to males of *Bryaxis*. Species of *Bryaxis* may possess two basically distinct forms of males. One, termed homomorphous (e.g., Jeannel 1950), has slender legs, a weak or no protibial notch, small or no protibial and metatibial denticles, and a highly modified antennal scape or pedicel. The second, termed heteromorphous (e.g., Nomura and Lee 1993) or oedymorous (e.g., Peyerimhoff 1899; Jeannel 1950), has conspicuously stout femora and tibiae, a deep protibial notch, and a strong protibial denticle. It has a less modified scape or pedicel, but often a larger body with a notably wider pronotum, and also broad aedeagal parameres. Intermediate forms may occur in some species (e.g., *B. nigripennis* (Aubé, 1844) and *B. clavicornis* (Panzer, 1806) from Central Europe). An attempt to define and name these intermediate forms has been made by Besuchet (1974). The function of the polymorphism in *Bryaxis* is unknown. It is unlikely to be of taxonomic significance because different forms of the same species may be sympatric (e.g., Peyerimhoff 1899; Jeannel 1950; Kurbatov 1994; Löbl 1964), but has obscured the taxonomic treatment of the group.

The morphological modifications may affect, in addition to the above mentioned organs and structures, and to a totally unexpected extent, also the endoskeleton. In *B. reversus*, the metendosternite (Figs 1, 2) is much wider in the heteromorphous



Figs 1 to 4. *Bryaxis reversus*. 1. Metendosternite, homomorphous male; 2. Metendosternite, heteromorphous male; 3. Inner surface of abdominal sternites, homomorphous male; 4. Inner surface of abdominal sternites, heteromorphous male. Scale bar = 100  $\mu$ m.

than in the homomorphous form and the internal basal ridges of abdominal sternite 7 are hypertrophied in the heteromorphous form, forming large lamina that cover most of the abdominal venter (Figs 3, 4).

### Material and Methods

Unless specified otherwise, all the material mentioned in the text has been examined. For dissection, the specimens were relaxed in about 1% ammonium hydroxide. The genitalia were placed for a few minutes in isopropanol and then mounted in Canada balsam on acetate slides. Specimens used for scanning electron microscopy were cleared in 0.1 N potassium hydroxide, then cleaned and coated.

Morphological terms are used as in Newton and Thayer (1996). The term frons, as used in the present study, refers to the area anterior of the level of the anterior

edges of the eyes, the term vertex to the area posterior of that level, and the term frontoclypeus (epistome) to the area inflexed toward the labrum. The length refers to the total length as measured from the inferior edge of the frontoclypeus to the apex of the abdomen. It may be variable depending on the state of the specimens. The length of the antennal segments is measured without the basal stalks, that of the eyes and of the aedeagi in dorsal view. The length of the scape refers to the shortest interval between the dorsobasal ridge and the apical scapal edge. The width of the scape and pedicel is measured without the glandular socle.

Descriptions are given for all the treated species except for a few which are compared with very similar species. The male gular groove and the male abdominal sternites 8 and 9 were not used as diagnostic characters. The aedeagi were examined in dorsal view only. The female genital plate is figured only when the conspecificity between the sexes was practically clear, and not in under-represented species. The state of the metathoracic wings was examined only in species and sexes represented by an adequate number of specimens.

Material from the following collections was examined, and the acronyms are used in the text:

BMNH: The Natural History Museum, London

EUMJ: Entomological Laboratory, Ehime University, Matsuyama

MHNG: Muséum d'histoire naturelle, Geneva

MNHN: Muséum National d'Histoire Naturelle, Paris

NSMT: National Science Museum, Tokyo

PCSK: Private collection of S. A. Kurbatov, Moscow

## Systematics

### *Tychobythinus* Ganglbauer, 1896

[Japanese name: Oni-onohige-arizukamushi zoku]

At present, four species of *Tychobythinus* are known to occur in Japan. *Tychobythinus aino* Kurbatov, 1992, which is not included in Löbl and Kurbatov (1996), can be distinguished from its Japanese congeners, which all lack vertexal sulci joined to the tentorial pits and converging anteriorly. These sulci are present and distinct in *T. aino*.

The genus is Holarctic, with one outlying species in Taiwan and another in Thailand (Löbl and Kurbatov, 1995).

### *Bythoxenites* Jeannel, 1958

[Japanese name: Horaana-onohige-arizukamushi zoku]

This genus has been defined by the presence of a longitudinal ridge on the median lobe of the aedeagus, and the absence of an internal pair of mediobasal foveae on the fourth abdominal sternite. The sternal character proves to be variable within *Bryaxis* (the foveae are absent in *B. hisamatsui*). Thus, *Bythoxenites* is defined by the aedeagal character only. Ten species were recognized by Löbl and Kurbatov (1996), who overlooked the paper of Tanokuchi (1990) with descriptions of *Bt. sulcithorax*,

*Bt. major*, and *Bt. rimicola*. This results in the following action: *Bythoxenites diversicornis* Löbl and Kurbatov, 1996 is placed in the synonymy of *Bt. sulcithorax* Tanokuchi, 1990 as a subjective junior synonym - syn. nov.

The genus, with at least 12 species, appears to be endemic to Japan.

***Bryaxis* Kugelann, 1794**

[Japanese name: Onohige-arizukamushi zoku]

The inadequate treatment of the Japanese members of this genus necessitates a revision based on the type material and redescriptions. The relations within the group are poorly understood. More detailed study, especially of additional character complexes, will be needed for an eventual resolution of these problems.

The genus is Palaearctic, with a high species diversity in both the western and eastern areas, but it is almost absent from large portions of Central Asia and is under-represented from China.

**Key to the Japanese species of *Bryaxis***

(*B. trichosus* Jeannel, 1958, known only by the female, is not included)

1. Frons not impressed between antennal tubercles ..... *B. iriomotensis* sp. n.
- Frons impressed between antennal tubercles ..... 2
2. Male tempora angulate ..... 3
- Tempora rounded or oblique in both sexes ..... 5
3. Elytron with basal portion of adsutural area conspicuously raised .....  
..... *B. taradakensis* sp. n.
- Elytron with adsutural area not raised ..... 4
4. Aedeagus with parameres evenly arcuate and gradually narrowed apically .....  
..... *B. hisamatsui* sp. n.
- Aedeagus with parameres sinuate, not narrowed apically ..... *B. yari* sp. n.
5. Inferior edge of frontoclypeus truncate ..... 6
- Inferior edge of frontoclypeus rounded ..... 9
6. Antennal segments 4 to 8 evenly long ..... *B. tetralobus* sp. n.
- Antennal segment 4 distinctly longer than segment 6 ..... 7
7. Maxillary palpi with segment 3 distinctly tuberculate ..... *B. frontalis* Jeannel
- Maxillary palpi not, or hardly, tuberculate ..... 8
8. Vertexal punctation even or almost even ..... *B. coiffaiti* Jeannel
- Vertexal punctation conspicuously more dense medially than laterally .....  
..... *B. sawadai* sp. n.
9. Antennal segments 4 and 5 elongate ..... 10
- Antennal segments 4 and 5 about as long as wide, or distinctly shorter than wide  
..... 11
10. Pronotum with discal punctation fine, much finer than that on median portion of  
vertex ..... *B. harmandi* Raffray
- Pronotum with discal punctation coarse, similar to that on median portion of  
vertex ..... *B. kofun* sp. n.
11. Vertex partly or entirely finely punctate ..... 12

- .Vertex entirely coarsely punctate .....17
- 12.Pronotal centre and lateral lobes with even, fine punctation.....13
  - .Pronotal punctation uneven, coarser on centre than on lateral lobes .....14
- 13.Vertexal punctation even, fine. Scape elongate. Pedicel not modified sexually ...
  - .....*B. platalea* sp. n.
- .Vertex with punctation coarse and dense along mid-line, fine on lateral portions.  
Scape not elongate. Male pedicel enlarged and bearing large socle .....
  - .....*B. jomon* sp. n.
- 14.Male pedicel carinate, lacking glandular socle .....15
  - .Male pedicel bearing glandular socle, not carinate .....16
- 15.Male pedicel with anterior edge entirely carinate .....*B. sumo* sp. n.
  - .Male pedicel with short carina .....*B. bushido* sp. n.
- 16.Male pedicel with glandular socle situated in shallow impression at mid-length of  
pedicel .....*B. gracilipalpis* Jeannel
  - .Male pedicel with glandular socle not in an impression, situated anterior of  
mid-length of pedicel .....*B. samurai* sp. n.
- 17.Maxillary palpi without tubercles on ventral side of segments 2 and 3, or with  
extremely low, inconspicuous ones .....18
  - .Maxillary palpi with distinct tubercles on ventral sides of segments 2 and 3 ...27
- 18.Scape much longer than wide .....19
  - .Scape about as long as wide .....20
- 19.Parameres of aedeagus truncate and approximate apically .....
  - .....*B. extremalis* Kurbatov
  - .Parameres of aedeagus rounded apically and approximate subapically .....
    - .....*B. reversus* (Sharp)
- 20.Frontoclypeus narrowed to form sharp mesial keel .....21
  - .Frontoclypeus rounded mesially, not forming mesial keel .....22
- 21.Anterior edge of frons conspicuously prominent and distinctly angulate .....
  - .....*B. koltzei* (Reitter)
  - .Anterior edge of frons slightly rounded, not angulate and not prominent .....
    - .....*B. sparsepunctatus* Jeannel
- 22.Vertexal sulci distinct, joined to frontal impression .....*B. japonicus* (Sharp)
  - .Vertexal sulci absent or hardly traceable .....23
- 23.Pronotal punctation uneven on central part, distinctly sparser than on vertex,  
with some intervals wider than diameters .....24
  - .Pronotal punctation even on central part, as dense as that on vertex, with  
intervals reduced to narrow ridges .....25
- 24.Male scape modified, pedicel simple .....*B. affinis* (Sharp)
  - .Male scape simple, pedicel modified .....*B. heian* sp. n.
- 25.Vertex convex. Male pedicel with glandular socle situated in an impression .....
  - .....*B. kamakura* sp. n.
  - .Vertex flattened. Male pedicel with glandular socle not in an impression .....26
- 26.Aedeagus with basal rods of internal sac diverging and not joined proximally ...
  - .....*B. sauteri* Raffray
  - .Aedeagus with basal rods of internal sac parallel and joined proximally .....
    - .....*B. peckorum* sp. n.
- 27.Male scape sexually modified, pedicel simple .....*B. mayumi* sp. n.
  - .Male scape not modified, pedicel sexually modified .....28

28. Internal sac of aedeagus with symmetrical rods, tips of parameres abruptly widened, each with two subapical setae ..... *B. humilis* Raffray  
 - Internal sac of aedeagus with asymmetrical rods, tips of parameres not abruptly widened and each with four subapical setae ..... 29
29. Internal sac of aedeagus with pair of large apical rods and pair of slender subapical rods ..... *B. naginata* sp. n.  
 - Internal sac of aedeagus with rods different ..... 30
30. Internal sac of aedeagus with right rod widened and bifid apically .....  
 ..... *B. hoko* sp. n.  
 - Internal sac of aedeagus without apically bifid rod ..... 32
31. Internal sac of aedeagus with rods completely overlapping apically .....  
 ..... *B. tanto* sp. n.  
 - Internal sac of aedeagus with rods not overlapping apically ..... 33
32. Internal sac of aedeagus with straight central rod ..... *B. karate* sp. n.  
 - Internal sac of aedeagus without straight central rod ..... *B. katana* sp. n.

***Bryaxis harmandi* Raffray, 1909**

[Japanese name: Harmand-onohige-arizukamushi]

*Bryaxis harmandi* Raffray, 1909: 38.

*Bryaxis* (*Arcobythus*) *harmandi*; Jeannel, 1958: 87.

**Type material examined:** lectotype ♂, labelled: Museum Paris Japon Nippon Moyen env. de Tokio J. Harmand 1906/Type (red)/*Bryaxis* Kugel. Bythinus auct. Harmandi n.sp. Type (handwritten). There is no doubt about the originality of the labels. However, the specimen was dissected before our study, and the aedeagus that was mounted in a glycerine slide (now remounted in Canada balsam) belongs to a different species than the body of the associated specimen. Raffray (1909) described and figured the antennal pedicel as subsphaerical, bearing a small, cylindrical, apically truncate tubercle. The pedicel in this specimen has a very large, tubercle-like socle. One of the species represented in the collections possesses the same aedeagal characters as the "type" of *B. harmandi*, and external characters fitting those in Raffray's description. This species is redescribed and figured below as *B. harmandi*. The other Japanese species possessing the same external characters as those in the "type" specimen is described in the present paper as *B. jomon*. The aedeagus associated with the body of *B. jomon*, and with the original identification label of Raffray, is here designated as the lectotype of *B. harmandi*.

**Additional material:** 4♂, 1♀, below Usui Pass, Matsuida-machi, Gunma Pref., 24.vii.1980, I. Löbl leg. (MHNG).

Length 1.45-1.50 mm. Body reddish-brown, appendages lighter. Pubescence long and semierect on head, pronotum, and elytra. Abdominal pubescence consisting of fairly long, recumbent setae and additional longer, semierect setae. Head and pronotum each with two pairs of conspicuously long setae.

Head with frontal impression impunctate. Anterior frontal edge not clearly delimited, subangulate. Frontoclypeus obliquely inflexed, rounded mesially, slightly prominent below, with inferior edge evenly rounded. Vertex slightly convexly raised,

with very low, short, hardly visible median ridge. Vertexal sulci absent. Tentorial pits about level of anterior edge of eye. Antennal tubercles smooth. Punctuation mostly very fine and sparse, but dense and coarse behind antennal tubercles and along mid-line of vertex. Eyes prominent, longer than tempora in ♂, slightly shorter than tempora in ♀. Tempora rounded.

Maxillary palpi with apical portions of second segment and third segment tuberculate ventrally.

Antennae with segments 3 to 5 elongate, but 4 and 5 evenly long, shorter than 3. Segments 6 to 8 evenly long, as wide as but shorter than segment 5, about as long as wide or segment 8 slightly wider. Segments 9 and 10 wider than long.

Pronotum 1.2 times as wide as long. Punctuation very fine and sparse on disc, dense and fairly coarse between base and antebasal sulcus.

Elytra with discal impression. Adsutural area not raised. Punctuation very fine and sparse, similar to that on pronotal disc, with intervals usually three to four times larger than puncture diameters.

Metathoracic wings: ♂ brachypterous, ♀ not examined.

Legs slender.

Male sexual characters. Scape flattened dorsoventrally, simple, about 0.08 mm long, as long as wide; posterior side straight, anterior side slightly convex. Pedicel enlarged, subglobular, 0.10-0.11 mm long and 0.09 mm wide, with glandular socle small, expanded around orifice, situated in middle of anterior side. Elytron with distinct humeral protuberance. Protibia with minute subapical notch. Metatibia curved in apical half, without apical denticle. Aedeagus (Fig. 5) 0.22-0.23 mm long. Parameres each bearing three dorsal and one ventral subapical setae, gradually narrowed from mid-length toward apices, with apical portion obliquely inflexed upward (lateral view). Basal portion of parameres covered by expanded median lobe. Internal sac simple, with long, almost straight rod.

Female sexual characters. Scape cylindrical, 0.07 mm long, hardly longer than wide. Pedicel subcylindrical, 0.07 mm long, 0.05 mm wide. Eyes smaller than in male.

**Distribution.** Japan: Honshu.

**Habitat.** Moist leaf and wood debris in a ravine.

**Comments.** The species may be easily distinguished by the punctuation in combination with the sexual characters.

***Bryaxis frontalis* Jeannel, 1958**

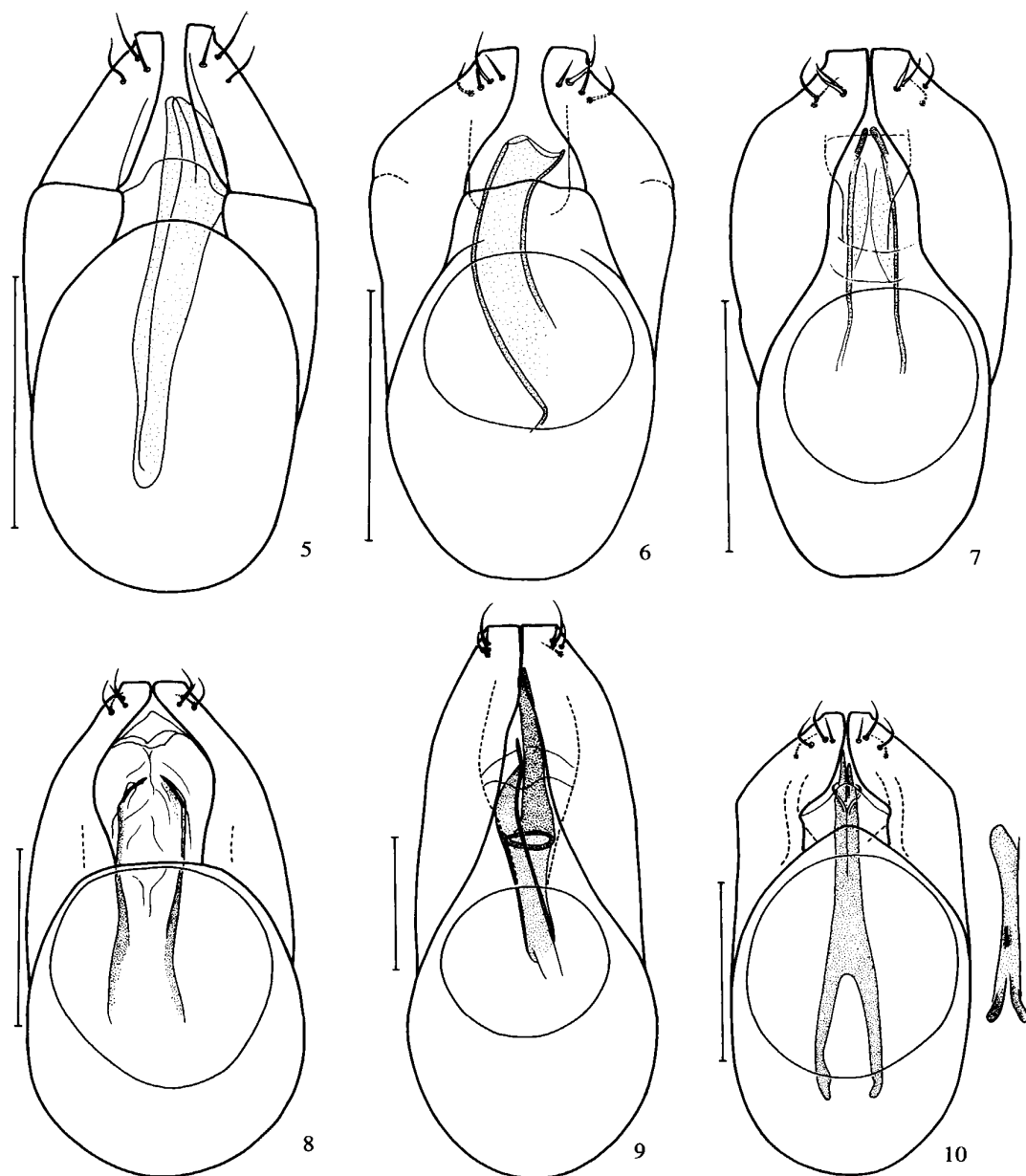
[Japanese name: Naga-onohige-arizukamushi]

*Bryaxis (Arcobythus) frontalis* Jeannel, 1958: 87.

**Type material examined:** holotype ♂: Mizuho-cho, Kyoto Pref., 24.vii.1957, H. Coiffait leg. (MNHN); paratype ♂: Takahashi-Nakai, Okayama Pref., 10.viii.1957, H. Coiffait leg. (MNHN).

**Additional material:** 16 exs., Shiga Kogen, 1500m, Joh-Shin-Etsu Kogen Nat. Park, Nagano Pref., 23.vii.1980, I. Löbl leg. (MHNG); 2 exs., Seryô Pass 13 km N of Kyoto, Kyoto Pref., 6.viii.1980, I. Löbl leg. (MHNG); 2 exs., same data but C. Besuchet leg.; 1 ex., same data but S. Naomi leg., (MHNG); 1 ex., Totsukawa, Mizuho-chô, Kyoto Pref., 10.vii.1986, S. Nomura leg. (NSMT); 1 ex., Mt. Kyôgatake, Kashima City, Saga





Figs 5 to 10. Aedeagi in *Bryaxis*. 5. *B. harmandi*; 6. *B. frontalis*; 7. *B. japonicus*; 8. *B. heian*; 9. *B. kofun*; 10. *B. jomon*. Scale bar = 0.1 mm.

Pref., 14.x.1986, S. Nomura leg. (NSMT); 1 ex., Todoroki Valley, Takaki-chô, Nagasaki Pref., 1.vi.1987, S. Nomura leg. (NSMT).

Length 1.25 - 1.40 mm. Body and appendages evenly reddish-brown, or elytra and appendices lighter. Pubescence long, semierect, that on abdomen recumbent, consisting of both relatively short and long setae. Head and pronotum each with two pairs of longer setae.

Head with frontal impression mostly smooth, distinctly punctate anteriorly.

Anterior frontal edge rounded in dorsal view, not well delimited. Frontoclypeus vertical, rounded mesially, slightly prominent below, with truncate inferior edge. Vertex slightly convex, with median ridge reduced or absent. Vertexal sulci absent. Tentorial pits situated level with anterior edge of eye. Antennal tubercles smooth. Punctuation fairly coarse and dense posterior to smooth antennal tubercles and on median portion of vertex, fine and sparse on remaining vertexal and frontal surface. Eyes prominent, longer than tempora in male, about as long as tempora in female. Tempora rounded.

Maxillary palpi with apical portion of second segment and third segment tuberculate ventrally.

Antennae with segments 3 to 8 almost evenly wide, segments 3 to 7 elongate, segment 8 slightly wider than long. Segment 3 about 1.5 times longer than wide and distinctly longer than segment 4. Segments 4 and 5 evenly long. Segments 6 and 7 evenly long, each shorter than segment 5 and slightly longer than wide. Segment 9 slightly or distinctly wider than long, segment 10 distinctly wider than long.

Pronotum 1.15 times as wide as long. Punctuation coarse and dense between antebasal sulcus and base, mostly fine and sparse on disc, punctures often variable in size, up to as large as that on vertexal centre.

Elytra with distinct discal impression. Adsutural area not or slightly raised. Punctuation fine and sparse, with intervals two to four times as large as puncture diameters.

Metathoracic wings: ♂ brachypterous, ♀ micropterous.

Legs slender.

Male sexual characters. Scape 0.05 mm long, 0.07 mm wide, simple, flattened dorsoventrally, with straight posterior side and slightly rounded anterior side. Pedicel enlarged, asymmetrically suboval, 0.09 - 0.10 mm long, 0.08 - 0.09 mm wide; glandular socle small, expanded around orifice, situated in middle of inferior side (not visible from above). Elytra with low humeral protuberance. Protibia with shallow subapical notch, subapical denticle indistinct. Metatibia curved in apical half, with a small apical denticle. Aedeagus (Fig. 6) 0.19 - 0.27 mm long. Parameres curved dorsally, gradually narrowed apically with truncate apices, bearing three dorsal and one ventral subapical setae. Internal sac simple, weakly sclerotized, evenly wide, and evenly incurved.

Female sexual characters. Scape subcylindrical, 0.06-0.08 mm long, 0.06-0.07 mm wide. Pedicel cylindrical, 0.06-0.07 mm long, 0.04-0.05 mm wide. Eyes smaller than in male. Humeral protuberance absent. Genital plate as shown in Fig. 40.

**Distribution.** Japan: Honshu, Kyushu.

**Habitat.** Moist leaf litter and other debris accumulated at bases of rocks and along a creek.

**Comments.** See under *B. coiffaiti*.

***Bryaxis coiffaiti*** Jeannel, 1958

[Japanese name: Coiffait-onohige-arizukamushi]

*Bryaxis (Arcobythus) coiffaiti* Jeannel, 1958: 88.

**Type material examined:** holotype ♂, Tosayama-Mura, Kochi Pref., Japan,

10.viii.1957, H. Coiffait leg. (MNHN).

**Additional material:** 1♂, Mt. Ishizuchi, 1000m, Ehime Pref., 14.viii.1980, I. Löbl leg. (MHNG); 1♂, 1♀, Omogo, Ishizuchi Nat. Park, Ehime Pref., 12.vii.1980, C. Besuchet leg. (MHNG); 1♀, same but Mt. Ishizuchi, 13-14.viii.1980 (MHNG); 5♂, 5♀, Omogo Valley, 700m, Ishizuchi Nat. Park, 18-25.viii.1980, S. and J. Peck leg. (MHNG, PCSK).

Length 1.55 - 1.70 mm. Body reddish-brown, head and pronotum usually darker than elytra and abdomen. Appendages as elytra, or slightly lighter. Pubescence long, semierect. Head and pronotum each with two pairs of conspicuously long setae.

Head with frontal impression punctate anteriorly, smooth in middle and posteriorly. Anterior frontal edge rounded in dorsal view, not well delimited. Frontoclypeus vertical, rounded mesially, slightly prominent below, with inferior edge truncate. Vertex slightly convex, without median ridge. Vertexal sulci absent. Tentorial pits situated slightly posterior of level of anterior eye edge. Punctuation coarse and dense on frons and vertex, most intervals much smaller than puncture diameters. Antennal tubercles almost impunctate. Eyes prominent, slightly longer than tempora. Tempora rounded.

Maxillary palpi without tubercles, or with apical portion of second segment and third segment tuberculate ventrally.

Antennae with segments 3 to 5 elongate. Segment 3 slightly wider than and about 1.4 times as long as segments 4 or 5. Segments 4 to 8 almost evenly wide, segments 6 and 7 as wide as long, segment 8 slightly wider than long. Segments 9 and 10 wider than long.

Pronotum 1.15 to 1.2 times as wide as long. Punctuation coarse and very dense, similar to that on vertex on most of disc. Punctuation finer and much sparser on lateral lobes and, sometimes, also finer on a small central area.

Elytra with distinct discal impression. Adsutural area slightly raised. Punctuation fine and sparse, intervals mostly about two to three times as large as puncture diameters.

Metathoracic wings: ♂ brachypterous, ♀ apterous.

Legs slender.

Male sexual characters. Scape simple, 0.07 mm long, 0.09 mm wide, flattened dorsoventrally, with anterior side convexly rounded, posterior side almost straight. Pedicel enlarged, suboval, 0.12 - 0.13 mm long, 0.10 mm wide, with inferior side impressed. Glandular socle short, expanded around orifice, situated in centre of impressed inferior side. Elytra with low humeral protuberance. Protibia notched, with small subapical denticle. Metatibia weakly curved, with small apical denticle. Aedeagus 0.20 - 0.22 mm, as in *B. frontalis*.

Female sexual characters. Scape subcylindrical, slightly narrowed apically, 0.07-0.08 mm long, hardly wider than long. Pedicel cylindrical, 0.07-0.08 mm long and 0.06 mm wide. Eyes smaller than in male. Humeral protuberance absent. Genital plate as in Fig. 41.

**Distribution.** Japan: Shikoku.

**Habitat.** Warm temperate and montane forests. In moss, leaf, and log litter.

**Comments.** The male sexual characters in this species are as in *B. frontalis*.

***Bryaxis japonicus*** (Sharp, 1874)

[Japanese name: Yamato-onohige-arizukamushi]

*Bythinus japonicus* Sharp, 1874: 125; 1883: 327.*Bryaxis* (*Arcobythus*) *brevipalpis* Jeannel, 1958: 89. - syn. n.*Bryaxis japonicus*; Kurbatov, 1994: 46.

**Type material examined:** *B. japonicus*, lectotype ♂ and paralectotypes 2♂, 2♀ (by present designation) from Fukuoka, Nagasaki [correctly, Fukahori, Nagasaki City] (BMNH); *B. brevipalpis*, holotype ♂ from Kochi Pref., Kawauchi [Ino-Cho Kawauchi in Jeannel, 1958], viii. 1957, H. Coiffait (MNHN).

**Additional material:** 103 exs., 8 km SE of Osaka, 750m, Osaka-machi, Gifu Pref., 1.viii.1980, I. Löbl leg. (MHNG); 5 exs., same data but A. and Z. Smetana leg. (MHNG); 1 ex., below Usui Bypass, 700m, Matsuida-machi, Gunma Pref., 20.vii.1980, I. Löbl leg. (MHNG); 2 exs., Kibune, Kyoto Pref., 10.vi.1973, K. Sawada leg. (MHNG); 2 exs., Shiroyama, Matsuyama, Ehime Pref., 10.viii.1980, I. Löbl leg. (MHNG); 1 ex., Suwa Shrine, Nagasaki City, Nagasaki Pref., 9. iii.1984, M. Ejima leg. (NSMT); 1 ex., Shitonezaki, Shikamachi-machi, Nagasaki Pref., 1. iv.1988, S. Nomura leg. (NSMT); 1 ex., Japan, 22. iii.1881, G. Lewis leg. (BMNH).

Length 1.20 - 1.40 mm. Body uniformly reddish-brown, appendages lighter. Pubescence fairly long, semierect on head, pronotum, and elytra, recumbent on abdomen.

Head with frontal impression mostly smooth, but coarsely punctate anteriorly. Anterior frontal edge subangular, not distinctly delimited in middle. Frontoclypeus vertical, rounded, and coarsely punctate mesially, slightly prominent below, with rounded inferior edge. Vertex convex, without median ridge. Vertexal sulci shallow, smooth, joined with frontal impression. Tentorial pits level with anterior edge of eye. Antennal tubercles smooth. Punctuation coarse and dense on frons and vertex, intervals between punctures very narrow, consisting mostly of ridges. Eyes prominent, longer than tempora. Tempora rounded.

Maxillary palpi not tuberculate, or third segment with very low ventral tubercles.

Antennae with segment 3 about as long as wide, or distinctly wider than long. Segments 4 to 8 almost evenly large, as wide as segment 3, each wider than long. Segments 9 and 10 wider than long.

Pronotum 1.10 to 1.15 times as wide as long. Punctuation coarse and dense on most of surface, with intervals much smaller than puncture diameters, mid-line smooth or sparsely punctate, lateral lobes finely punctate.

Elytra without discal impression. Adsutural area not raised. Punctuation very fine and sparse near base, dense and relatively coarse on most of discal surface, with intervals about as large as or up to two times larger than puncture diameters.

Metathoracic wings: ♂ macropterous, ♀ apterous.

Legs slender.

Male sexual characters. Scape simple, 0.04 mm long, 0.07 mm wide, impressed dorsobasally, with anterior side convex, posterior side slightly rounded. Pedicel enlarged, subglobular, 0.09 - 0.11 mm long, about 0.09 mm wide. Glandular socle small, expanded around apex, situated on basal half (posterior basal third) of upper

side of pedicel. Eyes distinctly longer than tempora. Humeral protuberance distinct. Protibia slightly curved, with fairly deep subapical notch and sharp subapical denticle. Metatibia curved in apical half, with apical denticle. Aedeagus (Fig. 7) 0.20 - 0.22 mm long. Parameres wide, with apical portion inflexed dorsally, apices truncate, outer edges slightly concave to oblique near apex, inner edges concave in middle portion, each bearing three dorsal and one ventral subapical setae. Internal sac simple, with two straight sclerotized rods slightly widened apically.

Female sexual characters. Scape 0.04 mm long, 0.07-0.08 mm wide. Pedicel about 0.05 mm long and wide. Eyes slightly longer than tempora. Humeral protuberance indistinct. Genital plate as shown in Fig. 42.

**Distribution.** Far East Russia; Japan: Honshu, Kyushu, and Shikoku.

**Habitat.** Warm temperate forest, in leaf, moss, log, and grass litter. Most specimens were taken at the edge of a *Cryptomeria* plantation.

**Comments.** This species has an aedeagus similar to that in the three previous species and is likely closely related to them.

***Bryaxis heian* sp. n.**

[Japanese name: Heian-onohige-arizukamushi]

**Holotype** ♂: Senjôgahara, 1400m, Nikko Nat. Park, Tochigi Pref., 15.viii.1980, I. Löbl leg. (MHNG).

**Paratypes:** 3♂, 1♀, same data as holotype (MHNG); 3♂, 6♀, Yoshibezawa, 600-700m, Kawai-mura, Iwate Pref., 16.viii.1991, A. Smetana leg. [J57] (MHNG, PCSK); 1♀, same but Zaimokuzawa, 720m, 15.viii.1991, [J54] (MHNG).

Length 1.35 - 1.40 mm. Body uniformly reddish-brown, appendages lighter. Pubescence fairly short, recumbent.

Head with frontal impression coarsely punctate anteriorly, finely punctate or impunctate posteriorly. Anterior frontal edge subangulate, not well delimited. Frontoclypeus vertical, rounded mesially, slightly prominent below, with rounded inferior edge. Vertex convex, without median ridge or with very low, more or less shortened one. Vertexal sulci shallow, smooth. Tentorial pits situated at or slightly anterior of level of anterior edge of eye. Antennal tubercles smooth. Punctuation on vertex and frons coarse and dense, intervals consisting mostly of narrow ridges. Eyes slightly longer than tempora in male, or as long as tempora in female. Tempora rounded.

Maxillary palpi with segments 2 and 3 bearing very low, inconspicuous ventral tubercles.

Antennae with segment 3 as long as or slightly longer than wide. Segments 4 to 8 evenly large, each as wide as segment 3, wider than long. Segments 9 and 10 wider than long.

Pronotum 1.1 times as wide as long. Punctuation irregular, consisting mostly of coarse and dense punctures on central part, usually finer near anterior edge and on lateral lobes. Punctures along middle line usually sparser than on more lateral area.

Elytra without discal impression. Adsutural area not raised. Humeral protuberance low. Punctuation fairly coarse, becoming finer toward base, with intervals mostly as large, but some up to two times as large, as puncture diameters.

Metathoracic wings: ♂ macropterous, ♀ apterous.

Legs slender.

Male sexual characters. Scape simple, 0.04-0.05 mm long, 0.07 mm wide, not flattened, with rounded anterior side and almost straight posterior side. Pedicel strongly enlarged, subglobular, 0.09 mm long, 0.10-0.11 mm wide; glandular socle minute, expanded around orifice, situated in basal half of upper side of pedicel. Eyes large. Humeral protuberance low. Protibia slightly curved, with fairly deep subapical notch and sharp subapical denticle. Metatibia slightly curved in apical half, with minute apical denticle. Aedeagus (Fig. 8) 0.28 mm long. Parameres wide basally, gradually narrowed toward apical third, evenly slender in apical third, truncate at apices, with apical portion inflexed dorsally; outer edges convex, inner edges concave and each bearing three dorsal and one ventral subapical setae. Internal sac with a long, straight, central, tube-like structure sclerotized along edges, overlapped apically by pair of very slender rods.

Female sexual characters. Scape 0.04-0.05 mm long, 0.06 mm wide. Pedicel 0.05 mm long, 0.06 mm wide. Eyes smaller than in male. Humeral protuberance absent. Genital plate as in Fig. 52.

**Distribution.** Japan: Honshu.

**Habitat.** Montane broad-leaf and mixed forests, leaf litter, moss, and fallen leaves, under ferns along a creek.

**Comments.** *Bryaxis heian* is similar to *B. japonicus*, but differs by the parameres of the aedeagus, which are more narrowed apically, and by the sclerotized structures of the internal sac. The female genital plate is very distinct in these species.

**Etymology.** The noun "*Heian*" refers to an historical period of Japan.

***Bryaxis kofun* sp. n.**

[Japanese name: Kofun-onohige-arizukamushi]

**Holotype** ♂: Fudago, 180m, Mt. Kiyosumi, Kimitsu City, Chiba Pref., 19.vii.1991, A. Smetana leg. [J1] (MHNG).

**Paratypes:** 1♂, 2♀, Narita, Chiba Pref., 13.vii.1980, A. and Z. Smetana leg. (MHNG).

Length 1.50 - 1.70 mm. Body uniformly reddish-brown, appendages lighter. Pubescence long, semierect to erect on head, pronotum, and elytra, recumbent with conspicuous long, erect setae on abdomen. Head and pronotum each with two pairs of conspicuously long, erect, lateral setae.

Head with frontal impression impunctate posteriorly, coarsely punctate anteriorly. Anterior frontal edge rounded, not well delimited. Frontoclypeus vertical, rounded mesially, slightly prominent below, with inferior edge slightly rounded. Vertex slightly convex, without sulci, with low, inconspicuous median ridge. Tentorial pits level with anterior edge of eye. Antennal tubercles smooth. Punctuation very fine and sparse near eyes and on lateral portion of vertex, coarse and very dense on middle portion of vertex and posterior to antennal tubercles, coarse punctures separated by very narrow intervals. Eyes prominent, about as long as (in ♂) or longer than (in ♀) tempora. Tempora rounded.

Maxillary palpi with apical portion of second segment and whole third segment

tuberculate ventrally.

Antennae with segments 3 to 8 almost evenly wide. Segment 3 about 1.5 to 1.8 times as long as wide. Segments 4 and 5 evenly large, slightly shorter than segment 3, elongate. Segments 6 to 8 shorter than segment 5, each about as long as wide. Segment 9 as wide as or slightly wider than long. Segment 10 wider than long.

Pronotum 1.15 to 1.20 times as wide as long. Punctuation coarse and dense on large central area of disc and between antebasal sulcus and base, consisting of punctures as large as those on middle portion of vertex. Punctuation very fine and very sparse near anterior pronotal edge and on lateral lobes.

Elytra without discal impression. Adsutural area not raised. Punctuation fine, with intervals mostly about two to five times as large as puncture diameters.

Metathoracic wings: ♂ not examined, ♀ apterous.

Legs fairly stout.

Male sexual characters. Scape simple, 0.07-0.08 mm long, hardly wider than long, subcylindrical in dorsal view, flattened dorsoventrally. Pedicel enlarged, 0.12 mm long, 0.09 mm wide, subcylindrical; glandular socle short but stout, expanded around orifice, situated on anterior side behind mid-length of pedicel. Eyes large. Humeral protuberances distinct. Protibia with deep subapical notch and strong subapical denticle. Metatibia curved in apical third, with strong apical denticle. Aedeagus (Fig. 9) 0.40-0.42 mm long. Parameres fairly slender, with apical portion slightly inflexed dorsally, outer edges slightly arcuate, apices truncate, and inner edges straight near apices. Each paramere bearing three subapical dorsal setae and one subapical ventral seta. Internal sac with tubular structure joined to long, gradually narrowed, sclerotized rod.

Female sexual characters. Scape subcylindrical in dorsal view, 0.09 mm long, 0.07 mm wide. Pedicel cylindrical, 0.08 mm long, 0.05 mm wide. Eyes smaller than in males. Humeral protuberance low. Genital plate as in Fig. 43.

**Distribution.** Japan: Honshu.

**Habitat.** Old oak and mixed broad-leaf forest, leaf litter, heap of old flood debris at edge of a small creek.

**Comments.** This species may be easily distinguished from all its congeners by the special shape of the male pedicel, in combination with the elongate antennal segments 4 and 5.

**Etymology.** The noun "*Kofun*" refers to an early period in Japanese culture.

***Bryaxis jomon* sp. n.**

[Japanese name: Jōmon-onohige-arizukamushi]

**Holotype** ♂: below Usui Pass, 850m, Matsuida-machi, Gunma Pref., 24.vii.1980, I. Löbl leg. (MHNG).

**Paratypes:** 3♂, 1♀, same data as holotype; 1♂, 2♀, Chuzenji, 1350m, Nikko Nat. Park, Tochigi Pref., 14.vii.1980, I. Löbl leg. (MHNG); 3♂, Kumanotaira, near Karuizawa, Gunma Pref., 26. ix.1907 (MNHN, MHNG); 8♂, 2♀, Tsuchigoya, 1400m, Ishizuchi Nat. Park, Ehime Pref., 11-18.viii.1980, S. and J. Peck leg. (MHNG); 6♂, same data but 16.viii.(MHNG); 15♂, 22♀, Ishizuchi Nat. Park, 1400-1700m, Ehime Pref., 13-14.viii.1980, C. Besuchet leg. (MHNG, PCSK).

Length 1.35-1.50 mm. Body uniform reddish-brown, appendages lighter. Pubescence fairly long, semierect to recumbent on head, pronotum, and elytra, recumbent on abdomen. Head and pronotum each with two pairs of conspicuous, long, erect setae. Abdominal tergites with several long, semierect setae.

Head with frontal impression finely punctate anteriorly, impunctate in middle and posteriorly. Anterior frontal edge rounded, not well delimited. Frontoclypeus obliquely inflexed, wide and rounded mesially, prominent below, with rounded anterior edge. Vertex convex, without sulci, with low median ridge. Tentorial pits situated posterior of anterior eye edge (in ♂) or level with anterior edge of eye (in ♀). Punctuation on most of vertex and frons sparse, very fine, and indistinct, but dense and coarse posterior of antennal tubercles and along vertexal ridge. Eyes prominent, longer than tempora in male, as long as tempora in female. Tempora rounded.

Maxillary palpi with apical portions of segments 2 and 3, or only that of segment 3, tuberculate ventrally.

Antennae with segment 3 about 1.2 to 1.5 times longer than wide, segments 4 to 8 evenly large, each about as long as wide and as wide as segment 3. Segments 9 and 10 wider than long.

Pronotum 1.1 times as wide as long. Punctuation usually very fine and very sparse except for somewhat coarser punctures near base, middle portion of disc in some specimen with scattered coarser punctures.

Elytra with discal impression distinct in male only. Adsutural area not raised. Punctuation fine and dense, intervals mostly about 1.5 to 3.0 times as large as puncture diameters.

Metathoracic wings: ♂ brachypterous, ♀ apterous.

Legs slender.

Male sexual characters. Scape simple, 0.05 mm long, 0.07 mm wide, not flattened, with straight posterior side, slightly convex anterior edge. Pedicel enlarged, 0.10-0.11 mm long, 0.08-0.09 mm wide, oval in dorsal view; glandular socle strongly enlarged but not more prominent than in other species, oval, longer than wide, about as long as one third of pedicel, expanded around orifice, situated about in middle of anterior side of pedicel. Eyes large. Humeral protuberance distinctly raised. Protibia straight, with minute subapical notch and denticle. Metatibia slightly curved in apical half, with small apical denticle. Aedeagus (Fig. 10) 0.24-0.26 mm long. Parameres wide and parallel or subparallel in basal half, rather abruptly inflexed dorsally in apical portion, with almost straight outer edges and narrowed, truncate apices, each bearing three dorsal and one ventral subapical setae. Internal sac with long, slender, basally bifid sclerite extending apically into two asymmetrical, spine-like rods.

Female sexual characters. Scape cylindrical, about 0.06 mm long and wide. Pedicel subcylindrical, 0.07 mm long, 0.04-0.05 mm wide. Eyes smaller than in males. Humeral protuberance hardly distinct.

**Distribution.** Japan: Honshu, Shikoku.

**Habitat.** In chestnut and *Fagus-Abies* forests. Under moist bark of an old chestnut, under logs, and in wood and leaf litter. One male from the Ishizuchi Nat. Park found in a Malaise trap.

**Comments.** This species may be easily distinguished from the other species by the pedicel with a large glandular socle.

**Etymology.** The noun "*Jomon*" refers to an early period in the Japanese culture.



***Bryaxis kamakura* sp. n.**

[Japanese name: Kamakura-onohige-arizukamushi]

**Holotype** ♂: 4 km SW of Tsumagoi, 1050m, Gunma Pref., 18.vii.1980, I. Löbl leg. (MHNG).

**Paratypes:** 5♂, 9♀, same data as holotype (MHNG, PCSK); 2♂, 6♀, Shiga Kogen, 1500m, Joh-Shin-Etsu Kogen Nat. Park, Nagano Pref., 23.vii.1980, I. Löbl leg. (MHNG); 1♂, Mt. Fuji, 2000-2300m, pref. unknown, H. Franz leg. [Ja 14] (NHMW).

Length 1.15-1.35 mm. Body uniformly dark reddish-brown, appendages lighter. Pubescence short, semierect to recumbent on head, pronotum, and elytra, recumbent on abdomen.

Head with frontal impression coarsely punctate in anterior half, finely punctate posteriorly. Anterior frontal edge prominent, subangular. Frontoclypeus oblique, wide, and rounded mesially, slightly prominent below, with slightly rounded inferior edge. Vertex convex, without sulci and without median ridge. Tentorial pits level with anterior edge of eye. Antennal tubercles and posterior portion of frontal impression smooth. Punctuation coarse and dense, punctures separated usually by narrow ridges. Eye prominent, longer (♂) or about as long as (♀) tempora. Tempora rounded.

Maxillary palpi without tubercles.

Antennae with segment 3 about as long as wide. Segments 4 to 8 wider than long, evenly large, or segments 6, 7, and 8 slightly shorter than segments 4 and 5. Segments 9 and 10 much wider than long.

Pronotum 1.2 times as wide as long. Punctuation coarse and dense, as coarse as that on vertex on most of central area, finer near anterior and lateral edges, usually less dense than that on vertex.

Elytra without discal impression. Adsutural area not raised. Punctuation dense and fairly coarse, becoming finer toward base, intervals mostly about as large as or up to two times as large as puncture diameters.

Metathoracic wings: ♂ macropterous, ♀ apterous.

Legs fairly stout.

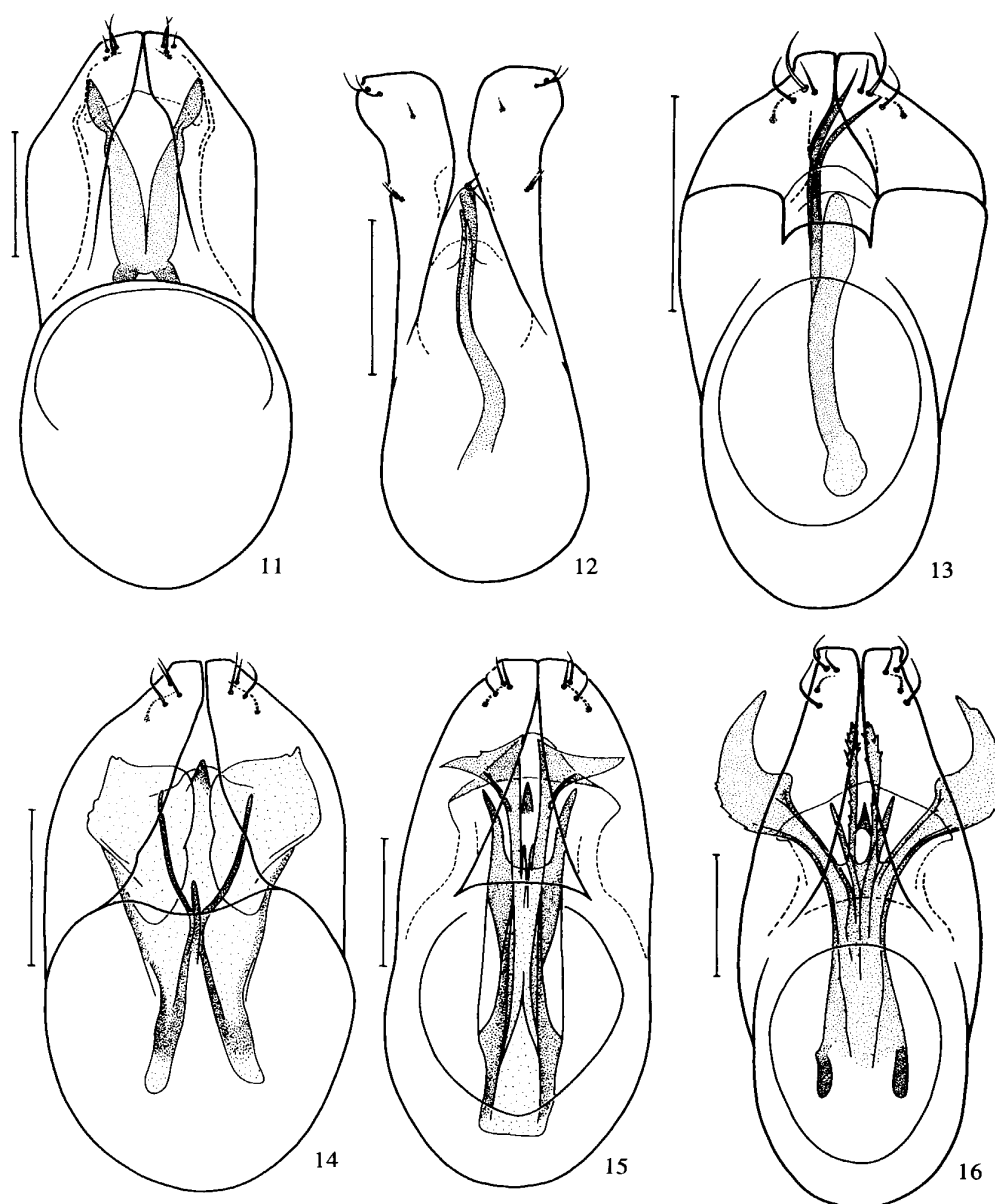
Male sexual characters. Scape simple, subcylindrical, 0.06 mm long, 0.09-0.10 mm wide, not flattened dorsoventrally. Pedicel enlarged, subglobular, 0.12-0.13 mm long, about as long as wide, with a smooth dorsal impression and a small glandular socle expanded around orifice, situated in impression. Eyes large. Humeral protuberance distinct. Protibia straight, with subapical notch and without a denticle. Metatibia curved in apical half, with apical denticle. Aedeagus (Fig. 11) 0.40-0.45 mm long. Parameres fairly wide, with outer edges subparallel in proximal two thirds, converging in apical third, apices slightly rounded or truncate. Each paramere bearing three dorsal and one ventral subapical setae. Internal sac with two apically diverging, basally joined rods.

Female sexual characters. Scape subcylindrical, 0.05 mm long, 0.06-0.07 mm wide. Pedicel 0.06 mm long, about as long as wide. Eyes smaller than in male. Humeral protuberance absent. Genital plate as in Fig. 45.

**Distribution.** Japan: Honshu.

**Habitat.** Mixed *Abies* and broad-leaved forests; in moist leaf litter.

**Comments.** This species may be easily distinguished from all its eastern



Figs 11 to 16. Aedeagi in *Bryaxis*. 11. *B. kamakura*; 12. *B. platalea*; 13. *B. sawadai*; 14. *B. sauteri*; 15. *B. peckorum*; 16. *B. samurai*. Scale bar = 0.1 mm.

Palearctic congeners by the shape of the sclerites of the internal sac of the aedeagus.

**Etymology.** The noun “*Kamakura*” refers to an ancient period in Japanese history.

***Bryaxis platalea* sp. n.**

[Japanese name: Hera-onohige-arizukamushi]

**Holotype** ♂: Mt. Ishizuchi, 1350m, Ehime Pref., 13.viii.1980, I. Löbl leg. (MHNG).

Length 1.35 mm. Body uniformly reddish-brown, appendages lighter. Pubescence short, semierect or recumbent on head, recumbent on pronotum, elytra, and abdomen. Frons with one pair of longer setae, pronotum with two pairs of longer, lateral setae.

Head with frontal impression finely punctate, punctation partly replaced by minute tubercles. Anterior frontal edge rounded, not well delimited. Frontoclypeus oblique, wide, and rounded mesially, barely prominent below, with inferior edge rounded. Vertex convex, without sulci, with low median ridge. Tentorial pits situated posterior to level of anterior edge of eye. Antennal tubercles smooth. Punctation fine, mostly sparse, but dense along vertexal ridge. Eyes longer than tempora. Tempora rounded.

Maxillary palpi with apical portions of segments 2 and 3 bearing ventral tubercles.

Antennae with segments 3 to 8 evenly wide. Segment 3 about 1.5 times as long as wide. Segments 4 and 5 even, shorter than segment 3, each about as long as wide. Segments 6 to 8 wider than long. Segments 9 and 10 wider than long.

Pronotum 1.2 times as wide as long. Punctation fine, similar to that on vertex, slightly coarser on area between antebasal sulcus and base.

Elytra with very shallow discal impression. Adsutural area slightly raised near base. Punctuation fine and sparse, slightly coarser than that on pronotum, intervals mostly two to four times as large as puncture diameters.

Metathoracic wings: not examined.

Legs slender.

Male sexual characters. Scape simple, 0.08 mm long, 0.06 mm wide, flattened dorsoventrally, almost cylindrical in dorsal view. Pedicel subcylindrical, simple, about 0.06 mm long, 0.03 mm wide. Eyes large. Humeral protuberance distinct. Protibia with shallow subapical notch and small subapical denticle. Metatibia slightly curved in apical two thirds, with narrow apical denticle. Aedeagus (Fig. 12) 0.33 mm long. Parameres not incurved dorsally, widened apically, with apical portion expanded laterally, each bearing two subapical dorsal setae, one subapical ventral seta, one centrolateral dorsal seta, and one centrolateral ventral seta. Internal sac with very slender, sinuate, overlapping rods.

**Distribution.** Japan: Shikoku.

**Habitat.** *Abies-Fagus* forest. Leaf litter under bamboo growth at foot of an old *Fagus*.

**Comments.** This species may be distinguished by the fine frontal punctation partly replaced by minute tubercles.

**Etymology.** The name refers to the shape of the parameres.

***Bryaxis sawadai* sp. n.**

[Japanese name: Sawada-onohige-arizukamushi]

**Holotype** ♂: Nara Park, Nara Pref., 8. viii.1980, I. Löbl leg. (MHNG).

**Paratypes:** 3♂, 8♀ same data as holotype (MHNG, PCSK); 2♀ same data as holotype but 11.viii.1980, A. and Z. Smetana leg. (MHNG); 2♂, Mt. Kasuga, Nara

Pref., 1.xi.1954, K. Sawada leg. (MHNG); 1♂, Kyoto, Kyoto Pref., 18-20.viii.1980, C. Besuchet leg. (MHNG); 1♂, Daimojiyama, Kyoto Pref., 20.ix.1966, K. Sawada leg. (MHNG); 1♂, 8 km SE of Osaka, 750m, Osaka-machi, Gifu Pref., 1.viii.1980, I. Löbl leg. (MHNG); 1♂, 2♀, Arimine, 1150m, Kaminikawa, Toyama Pref., 29.vii.1980, I. Löbl leg. (MHNG).

Length 1.50 - 1.70 mm. Body uniformly reddish-brown, appendages lighter. Pubescence long, semierect. Head with two pairs of distinctly longer setae, pronotum with one pair of longer setae.

Head with frontal impression smooth or finely punctate posteriorly, coarsely punctate anteriorly. Anterior frontal edge subangulate, not well delimited. Frontoclypeus vertical, rounded mesially, prominent below, with transverse inferior edge. Vertex slightly convex, without sulci and without median ridge. Tentorial pits at level of anterior eye edge. Antennal tubercles smooth. Punctuation coarse, mostly dense, with intervals partly formed by narrow ridges. Punctuation near tempora usually notably sparser than that near mid-line of vertex. Eyes prominent, longer than tempora in male, shorter than tempora in female. Tempora rounded.

Maxillary palpi without tubercles.

Antennae with segments 3 to 8 almost evenly wide, segments 3 to 5 distinctly elongate. Segment 3 about 1.4 to 1.5 times as long as wide and longer than segments 4 or 5. Segments 6 and 7 as long as wide or slightly longer than wide. Segment 8 about as long as wide, or wider than long. Segments 9 and 10 wider than long.

Pronotum 1.10 to 1.15 times as wide as long. Punctuation coarse and dense, similar to vertexal punctuation on admesial areas, less dense in middle, fine and sparse on lateral lobes.

Elytra with distinct discal impression. Adsutural area slightly raised near base. Punctuation fine and sparse, intervals mostly three to four times as large as puncture diameters.

Metathoracic wings: male brachypterous, female micropterous.

Legs fairly stout.

Male sexual characters. Scape simple, 0.06-0.07 mm long, 0.08-0.09 mm wide, subcylindrical, flattened, with posterior side straight, anterior side rounded. Pedicel enlarged, 0.10-0.11 mm long, 0.09 mm wide, subglobular; glandular socle expanded around orifice, situated near middle of inferior side (not visible from above). Eyes large. Humeral protuberance distinct. Protibia straight, with deep subapical notch and long subapical denticle. Metatibia curved in apical half, with strong apical denticle. Aedeagus (Fig. 13) 0.24-0.26 mm long. Parameres wide, notably narrowed in apical portion, inflexed dorsally in apical portion, with apices truncate, outer and inner edges arcuate. Each paramere bearing three dorsal and one ventral subapical setae. Internal sac with two curved, stylet-like rods and long, slender median tube.

Female sexual characters. Scape about 0.08 mm long, 0.06 mm wide, slightly narrowed apically. Pedicel cylindrical, 0.06 mm long, 0.05 mm wide. Genital plate as in Fig. 51.

**Distribution.** Japan: Honshu.

**Habitat.** Temperate oak forests. Leaf, moss, and wood litter along large oak log.

**Comments.** This species is characterized by the truncate frontoclypeal edge in combination with the long pubescence, and by the male pedicel with a ventral glandular socle.

**Etymology.** The species is named in honour of Dr. K. Sawada who significantly contributed to the knowledge of the Japanese pselaphines.

***Bryaxis sauteri* Raffray, 1909**

[Japanese name: Sauter-onohige-arizukamushi]

*Bryaxis sauteri* Raffray, 1909: 39.

*Bryaxis (Bythiniana) sauteri*; Jeannel, 1958: 92.

**Type material examined:** lectotype ♂ (by present designation): from Yamanaka according to Raffray (1909), labelled: det. Holdhaus Bythinus Sauteri m./Muséum Paris 1917 Coll. A. Raffray/Japan Sauter/B.Sauteri A.Raffray det./Sauteri R. (hand-written by Jeannel), and lectotype *Bryaxis sauteri* det. Löbl 1997 (MNHN).

**Additional material:** 2♂, 3♀, 8 km SE of Gero, 500m, Gero-machi, Gifu Pref., 31.vii.1980, I. Löbl leg. (MHNG); 3♂, 4♀, same but 9 km E of Gero, 450-500m, (MHNG); 1♂, Mt. Hiei, Kyoto Pref., 27.viii.1981, R. Yosii leg. (MHNG); 1♂, 2♀, Seryô Pass near Kyoto, 500-600m, Kyoto Pref., 6.viii.1980, C. Besuchet leg. (MHNG); 7♂, 4♀, Yaseyûen, Kyoto, Kyoto Pref., 4.viii.1980, C. Besuchet leg. (MHNG, PCSK); Sanage-yama, Aichi Pref., 24. x.1970, K. Yamagishi leg. (MHNG).

Length 1.50-1.65 mm. Body dark reddish-brown, elytra brighter reddish, appendages, scape excepted, slightly lighter than body, scape as dark as body. Pubescence fairly long, semierect on head, pronotum, and elytra, recumbent on abdomen.

Head with frontal impression coarsely punctate anteriorly and in middle, smooth posteriorly. Anterior frontal edge rounded, not well delimited. Frontoclypeus oblique, rounded mesially, slightly prominent below, with inferior edge evenly rounded. Vertex flattened, without sulci and without median ridge. Tentorial pits situated level with anterior edge of eye. Punctuation coarse and very dense on entire vertex and frons, including antennal tubercles, or slightly finer on antennal tubercles; most punctures separated by very narrow ridges. Eyes prominent, about as long as tempora in male, shorter than tempora in female. Tempora rounded.

Maxillary palpi without tubercles.

Antennae with segment 3 about 1.3 to 1.4 times as long as wide. Segments 4 to 8 almost evenly large, each as long as wide, or slightly wider than long. Segments 9 and 10 wider than long.

Pronotum 1.05 to 1.10 times as wide as long. Punctuation entirely coarse and very dense, similar to that on vertex.

Elytra with short and shallow discal impression. Adsutural area not raised. Punctuation relatively coarse, with intervals mostly as large to 2.5 times as large as puncture diameters, becoming finer toward base.

Metathoracic wings: ♂ macropterous, ♀ apterous.

Legs slender or fairly stout.

Male sexual characters. Scape simple, 0.06 mm long, 0.09 mm wide, not flattened, with posterior side almost straight, anterior side convex. Pedicel enlarged, 0.10 mm long, 0.12-0.13 mm wide, strongly asymmetrical, with convexly rounded posterior side, expanded dorsoanteriorly and gradually narrowed to tip bearing a glandular socle. Glandular socle short, expanded around orifice, oriented dorsally. Eyes large.

Humeral protuberance distinct. Protibia hardly curved, with subapical notch variably deep and subapical denticle variably large. Metatibia curved in apical third, with robust apical denticle. Aedeagus (Fig. 14) 0.33-0.37 mm long. Parameres wide, gradually narrowed apically, with apical portion barely inflexed dorsally, apex truncate, outer edge evenly arcuate, each paramere bearing three dorsal and one ventral subapical setae. Internal sac complex, with pair of characteristic denticulate plates overlapping central plate and slender central rod.

Female sexual characters. Scape subcylindrical, 0.06-0.07 mm long, 0.07-0.08 mm wide, with slightly rounded anterior edge. Pedicel subcylindrical, 0.06 mm long, 0.06-0.07 mm wide. Eyes smaller than in male. Humeral protuberance indistinct. Female genital plate as in Fig. 53.

**Distribution.** Japan: Honshu.

**Habitat.** Warm-temperate broad-leaf forests and in plantation of *Cryptomeria*; in moist leaf, moss, and wood litter.

**Comments.** The central sclerite of the internal sac projects apically in the lectotype, while it is subapical with respect to the central plate in the remaining six males examined.

***Bryaxis peckorum* sp. n.**

[Japanese name: Peck-onohige-arizukamushi]

**Holotype** ♂: Omogo, 700m, Ishizuchi Nat. Park, Ehime Pref., 12.viii.1980, I. Löbl leg. (MHNG).

**Paratypes:** 3♂, 6♀, same data as holotype (MHNG); 5♂, 3♀, same data but C. Besuchet leg. (MHNG, PCSK); 5♂, 5♀, same but Omogo Valley, 18-25.viii.1980, S. and J. Peck leg. (MHNG); 2♂, 2♀, Mt. Ishizuchi, 1000m, Ehime Pref., 14.viii.1980, I. Löbl leg. (MHNG); 1♂, same but 1350m, 13.viii.1980 (MHNG).

Length 1.50-1.65 mm. Colour, pubescence, and external diagnostic characters as in *B. sauteri*, but elytra with adsutural area slightly raised, pronotum 1.1 times as wide as long. Distinguished significantly in male and female genital features. Aedeagus (Fig. 15) 0.31-0.34 mm long. Parameres not inflexed dorsally, with outer edge less arcuate than in *B. sauteri*. Apical plates of internal sac pointed laterally. Female genital plate (Fig. 55) with nearly triangular sclerite less projected basally than in *B. sauteri*.

Metathoracic wings: ♂ macropterous, ♀ micropterous.

**Distribution.** Japan: Shikoku.

**Habitat.** Warm temperate forest. In moss, fungi, and log litter.

**Etymology.** Named in honour of Drs. Jarmila and Stewart B. Peck, Ottawa, who collected this and many other new species of insects.

***Bryaxis samurai* sp. n.**

[Japanese name: Samurai-onohige-arizukamushi]

**Holotype** ♂: 4 km SW of Tsumagoi, 1050m, Gunma Pref., 18.vii.1980, I. Löbl leg. (MHNG).

**Paratypes:** 2♂, same data as holotype (MHNG).

Length 1.7 mm. Body and scape uniformly reddish-brown, appendages lighter. Pubescence long, semierect to erect on head, pronotum, and elytra, recumbent on abdomen. Head and pronotum with two pairs of conspicuously long lateral setae.

Head with frontal impression mostly impunctate, but finely punctate near anterior edge. Anterior edge of frons subangulate, fairly well delimited. Frontoclypeus vertical, rounded mesially, slightly prominent below, with rounded inferior margin. Vertex weakly convex, with low median ridge, lacking sulci. Tentorial pits situated posterior to level of anterior edge of eye. Antennal tubercles smooth. Punctuation coarse and dense near vertexal ridge and behind antennal tubercles, becoming more sparse and very fine near eyes and tempora. Eyes prominent, longer than tempora. Tempora oblique.

Maxillary palpi with segment 2 bearing extremely low tubercles, segment 3 with distinct ventral tubercles.

Antennae with segments 3 to 8 evenly wide. Segment 3 1.4 times as long as wide. Segments 4 to 8 evenly large, each about as long as wide. Segment 9 as wide as long, or slightly wider than long. Segment 10 distinctly wider than long.

Pronotum 1.1 times as wide as long. Punctuation irregular, with scattered coarse and fine punctures on median portion of disc; lateral lobes very finely punctate.

Elytra without distinct discal impression. Adsutural area slightly raised anteriorly. Humeral protuberance distinct. Punctuation fine and sparse, intervals mostly two to five times as large as puncture diameters.

Metathoracic wings: ♂ brachypterous, ♀ unknown.

Legs stout.

Male sexual characters. Scape simple, flattened, 0.07-0.08 mm long, 0.08-0.09 mm wide, with posterior side straight, anterior side convexly rounded. Pedicel enlarged, asymmetrically ovoid, 0.13-0.14 mm long, 0.12 mm wide, with small glandular socle situated on anterior side at level of widest point, just posterior to basal third of pedicel. Glandular socle expanded around orifice, oblique. Protibia barely curved, with deep subapical notch and strong subapical denticle. Metatibia curved in apical third, with strong apical denticle. Aedeagus (Fig. 16) 0.45 mm long. Parameres slender, weakly narrowed apically, apices truncate, outer edges slightly sinuate, inner edges arcuate, each bearing three dorsal and one ventral subapical setae. Internal sac complex, with conspicuous pair of large, prominent lateral apophyses and pair of slender central apophyses bearing minute tubercles.

**Distribution.** Japan: Honshu.

**Habitat.** Accumulation of moist leaf litter along rocks, on a steep slope.

**Comments.** The structures of the internal sac of this species indicate a close relationship to *B. sauteri* and *B. peckorum*, but it may be easily distinguished from them by the fine pronotal punctuation.

**Etymology.** The noun “samurai”, an ancient member of the Japanese military class, refers to the armature of the internal sac.

***Bryaxis katana* sp. n.**

[Japanese name: Katana-onohige-arizukamushi]

**Holotype** ♂: Mt. Ishizuchi, 1000m, Ehime Pref., 14.viii.1980, I. Löbl leg. (MHNG).

**Paratypes:** 7♂, 13♀, same data as holotype (MHNG, PCSK); 2♂, 1♀ same data but 13-14.viii.1980, C. Besuchet leg. (MHNG).

Length 1.65 - 1.80 mm. Body reddish-brown, appendices lighter. Pubescence long, semierect on head, pronotum, and elytra, fairly short and almost recumbent on abdomen.

Head with frontal impression punctate anteriorly, more or less smooth posteriorly. Anterior frontal edge rounded in dorsal view. Frontoclypeus vertical, not prominent below, rounded mesially, with evenly rounded inferior edge. Vertex flattened, with median ridge low, variably long, sometimes strongly shortened and distinct only posteriorly. Vertexal sulci absent. Tentorial pits level with anterior edge of eye. Antennal tubercles punctate. Punctuation coarse and dense on frons and vertex, intervals between punctures very narrow and flat, or consisting of ridges. Eyes prominent, about as long as tempora. Tempora rounded.

Maxillary palpi with apical portions of segments 2 and 3 bearing ventral tubercles.

Antennae with segment 3 about 1.5 times as long as wide. Segments 4 to 8 almost evenly large, each about as long as wide, narrower than segment 3. Segments 9 and 10 each wider than long.

Pronotum 1.1 times as wide as long. Punctuation similar to that on vertex but less dense on middle of disc, more dense and confluent along basal pronotal margin.

Elytra with distinct discal impression. Adsutural area slightly raised. Punctuation evenly fine and sparse, with intervals usually two to four times as large as puncture diameters.

Metathoracic wings: ♂ brachypterous, ♀ apterous.

Legs stout.

Male sexual characters. Scape simple, flattened dorsoventrally, short, about 0.05 mm long, 0.08 mm wide, with anterior edge convexly rounded, posterior edge almost straight. Pedicel enlarged, twice as long as scape and as long as wide. Glandular socle expanded around orifice, situated just at 1/3 length of pedicel. Anterior side of pedicel flattened and narrowed between glandular socle and apex. Elytra with distinct humeral protuberance. Protibia with subapical denticle and deep notch. Metatibia slightly curved, with apical denticle. Aedeagus (Fig. 17) 0.47 - 0.50 mm long. Parameres slender, not inflexed, with three dorsal and one ventral subapical setae. Internal sac with a complex of long, more or less curved, sclerotized stylets.

Female sexual characters. Scape and pedicel subcylindrical, each about 0.08 mm long, scape hardly longer than wide, pedicel distinctly longer than wide. Genital plate as in Fig. 49.

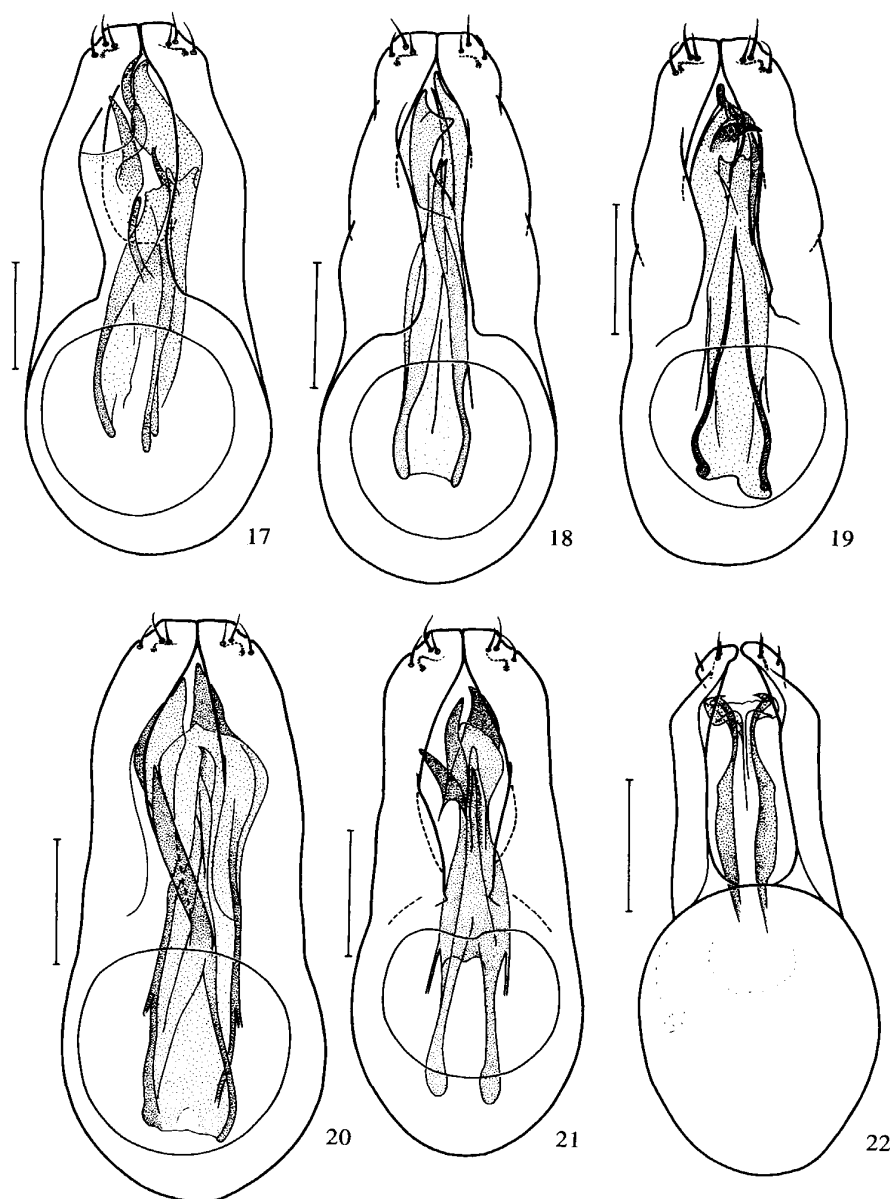
**Distribution.** Japan: Shikoku.

**Habitat.** Moss and leaf litter in *Fagus* forest; moist wood and leaf litter in ravine.

**Comments.** This species is characterized by the asymmetrical sclerites of the internal sac comprising different shape of rods not overlapping apically and lacking the straight central rod.

**Etymology.** The noun "*katana*", a long Japanese sabre, refers to the shape of the sclerites of the internal sac of the aedeagus.





Figs 17 to 22. Aedeagi in *Bryaxis*. 17. *B. katana*; 18. *B. hoko*; 19. *B. tanto*; 20. *B. naginata*; 21. *B. karate*; 22. *B. humilis*. Scale bar = 0.1 mm.

***Bryaxis hoko* sp. n.**

[Japanese name: Hoko-onohige-arizukamushi]

**Holotype** ♂: Shiga Kogen, 1500m, Joh-Shin-Etsu Kogen Nat. Park, Nagano Pref., 23.vii.1980, I. Löbl leg. (MHNG).

**Paratypes**: 9♂, 11♀, data as for holotype (MHNG, PCSK); 4♂, 7♀, 4 km SW of Tsumagoi, 1050m, Gunma Pref., 18.vii.1980, I. Löbl leg. (MHNG).

Length 1.45-1.60 mm. Body and appendages uniformly reddish-brown.

Pubescence long and erect on head, pronotum, and elytra, recumbent on abdomen.

Head with frontal impression entirely coarsely punctate. Anterior frontal edge rounded, not well delimited. Frontoclypeus oblique, widely rounded mesially, slightly or not prominent below, with rounded inferior edge. Vertex flattened, with or without a low median ridge. Vertexal sulci absent. Tentorial pits level with anterior edge of eye (male) or slightly anterior of that level (female). Antennal tubercles smooth. Punctuation on frons and vertex evenly very dense and coarse, punctures separated by narrow ridges. Eyes prominent, about as long as tempora in male or shorter in female. Tempora rounded.

Maxillary palpi with apical portions of segments 2 and 3 ventrally tuberculate.

Antennae with segment 3 about 1.2 to 1.5 times as long as wide. Segments 4 to 8 evenly, or almost evenly large, each slightly wider than long. Segments 9 and 10 wider than long.

Pronotum 1.10 to 1.15 times as wide as long. Punctuation coarse and dense on large central portion of disc, very fine on lateral lobes.

Elytra without discal impression. Adsutural area not or slightly raised. Punctuation sparse and fine, intervals mostly about 10 times as large as puncture diameters.

Metathoracic wings: ♂ micropterous, ♀ apterous.

Legs stout.

Male sexual characters. Scape simple, 0.06 mm long, 0.07 mm wide, subcylindrical, with anterior side slightly convexly rounded. Pedicel enlarged, asymmetrical, 0.09-0.10 mm long, 0.10-0.11 mm wide, widest in basal third, from widest point gradually narrowed toward apex and flattened. Glandular socle small, expanded around orifice, oblique, situated at widest point of pedicel. Eyes large. Humeral protuberance distinct. Protibia straight, with a deep subapical notch and large subapical denticle. Metatibia curved near apex, with robust apical denticle. Aedeagus (Fig. 18) 0.42-0.44 mm long. Parameres slender, sinuate, truncate at apex, not inflexed dorsally, with three dorsal and one ventral subapical setae. Internal sac with a large discoid piece and with several long, slender, apically tridentate rods; right rod widened and bifid apically.

Female sexual characters. Scape subcylindrical, 0.06-0.07 mm long and wide. Pedicel subcylindrical, 0.06-0.07 mm long, 0.05 mm wide. Eyes smaller than in male. Humeral protuberance absent. Genital plate as in Fig. 56.

**Distribution.** Japan: Shikoku.

**Habitat.** Steep ravines, moist leaf litter accumulated on stony slopes.

**Comments.** This species is characterized by the shape of the sclerotized rods of the internal sac of the aedeagus. It may be easily distinguished from all its Japanese congeners by the right rod of the internal sac, which is widened and bifid apically.

**Etymology.** The noun "*hoko*", a Japanese trident, refers to the shape of the apical portion of the sclerites of the internal sac of the aedeagus.

***Bryaxis naginata* sp. n.**

[Japanese name: Naginata-onohige-arizukamushi]

**Holotype** ♂: 9 km E of Gero, 450-500m, Gero-machi, Gifu Pref., 31.vii.1980, I. Löbl leg. (MHNG).

**Paratype:** 1 ♀, same data as holotype (MHNG).

Length 1.55-1.60 mm. Body uniformly reddish-brown, appendages lighter.

Principal characters as in *B. hoko* but pronotal punctation denser, elytra with slightly raised adsutural area, and aedeagus (Fig. 20) 0.47 mm long, with significantly differently shaped sclerites of internal sac, including two apical sclerites, with the left one joined to the large discoid piece.

Metathoracic wings not examined.

**Distribution.** Japan: Honshu.

**Habitat.** Leaf and wood litter on steep slope.

**Etymology.** The noun "*naginata*", a Japanese halberd, refers to the shape of one of the sclerites of the internal sac of the aedeagus.

***Bryaxis tanto* sp. n.**

[Japanese name: Tantô-onohige-arizukamushi]

**Holotype** ♂: between Meotobuchi and Kaniyu, 1402 m, Kuriyama-mura, Tochigi Pref., 20.viii.1991, A. Smetana leg. [J64] (MHNG).

**Paratypes:** 3 ♀, same data as holotype (MHNG).

Length 1.55-1.65 mm. Body uniformly reddish-brown, appendages lighter.

Principal characters as in *B. hoko* but pronotum 1.2 times as wide as long, elytra with flat adsutural area, and aedeagus (Fig. 19) 0.40 mm long, with significantly differently shaped sclerites of internal sac. Notable features of latter are presence of incurved, pointed, subapical rod and absence of apically bifid sclerite and large discoid piece. Female genital plate as in Fig. 50.

Metathoracic wings: ♂ not examined, ♀ apterous.

**Distribution.** Japan: Honshu.

**Habitat.** Leaf litter and other debris in depressions on floor in mixed forest.

**Etymology.** The noun "*tantô*", a Japanese knife, refers to the shape of the sclerites of the internal sac of the aedeagus.

***Bryaxis karate* sp. n.**

[Japanese name: Karate-onohige-arizukamushi]

**Holotype** ♂: Seryô Pass, 13km N of Kyoto, 500-600m, Kyoto Pref., 6.viii.1980, I. Löbl leg. (MHNG).

**Paratypes:** 7 ♂, 4 ♀, same data as holotype (MHNG, PCSK); 1 ♀, same data but A. Smetana (MHNG); 1 ♂, Nara Park, Nara Pref., 8.viii.1980, I. Löbl (MHNG); 1 ♀, same but 10.viii.1980, A. and Z. Smetana leg. (MHNG).

Length 1.40-1.55 mm. Body uniformly reddish-brown, appendages lighter. Pubescence long, semierect on head, pronotum, and elytra, recumbent on abdomen.

Principal characters as in *B. hoko* but head and pronotum with punctation almost evenly coarse and very dense, consisting of punctures mostly separated by very narrow ridges. Pronotum as wide as long, or up to 1.1 times as wide as long. Elytral punctation coarser and more dense than in *B. hoko*, intervals about two to three times

as large as puncture diameters. Aedeagus (Fig. 21) 0.42 mm long, with apical sclerotized rods of internal sac incurved and joined to subapical plate, and distinct, straight, gradually narrowed, central rod present. Female genital plate as shown in Fig. 54.

Metathoracic wings: ♂ brachypterous, ♀ micropterous.

**Distribution.** Japan: Honshu.

**Habitat.** Leaf and wood litter in oak forests.

**Comments.** *Bryaxis karate* and *B. katana* possess similar apical rods of the internal sac of the aedeagus. *Bryaxis karate* may be distinguished from *B. katana* by the presence of the distinct, straight, central rod.

**Etymology.** The noun "*karate*" is a very popular Japanese martial art.

***Bryaxis yari* sp. n.**

[Japanese name: Yari-onohige-arizukamushi]

**Holotype** ♂: Seryô Pass, 13 km N of Kyoto, 500-600m, Kyoto Pref., 6.viii.1980, I. Löbl leg. (MHNG).

Length 1.30 mm. Body light reddish-brown, elytra slightly paler than pronotum and abdomen. Appendages about as light as elytra. Pubescent fairly long, erect on head, semierect on pronotum and elytra, recumbent on abdomen. Frons and vertex each with pair of very long setae.

Head with frontal impression well delimited, coarsely punctate anteriorly, smooth posteriorly. Anterior frontal edge angulate. Frontoclypeus narrowed to form obtuse, vertical, mesial keel, slightly prominent ventrally, with inferior edge evenly rounded. Vertex flattened, without median ridge. Vertexal sulci absent. Tentorial pits situated posterior of anterior eye edge. Antennal tubercles with few fine punctures. Vertex and most of frons coarsely and very densely punctate, most intervals consisting of very narrow ridges. Eyes moderately prominent, about as long as tempora. Tempora angulate near eye, oblique toward neck.

Maxillary palpi with apical portion of second segment and third segment tuberculate ventrally.

Antennae with segments 3 to 8 almost evenly wide. Segment 3 elongate, about 1.4 times as long as wide. Segment 4 as long as wide, following two segments barely wider than long. Segments 7 and 8 wider than long. Segments 9 and 10 wider than long.

Pronotum 1.15 times as wide as long. Punctuation coarse and very dense, intervals in middle portion wider than in lateral parts, narrow median area of discus impunctate.

Elytra with distinct discal impression. Adsutural area slightly raised anteriorly. Punctuation fine and sparse, intervals mostly 1.5 to three times as large as puncture diameters.

Metathoracic wings: ♂ macropterous, ♀ unknown.

Legs slender.

Male sexual characters. Scape 0.06 mm long, 0.07 mm wide, simple, subcylindrical, slightly flattened from above, with almost straight anterior edge and slightly rounded posterior edge. Pedicel enlarged, 0.09 long, 0.10 mm wide, without

glandular socle, flattened and strongly expanded anteriorly, with anterior edge asymmetrically rounded and narrowly carinate. Apical anterior angle of pedicel obtuse, basal anterior angle rounded. Elytra with distinct humeral protuberance. Protibia straight, with inconspicuous subapical notch. Metatibia slightly curved apically and with a small apical denticle. Aedeagus (Fig. 23) 0.27 mm long. Parameres wide, not inflexed dorsally, with rounded apices and almost straight inner edges, each bearing three dorsal and one ventral subapical setae. Internal sac very simple, with single straight and slender sclerotized rod.

**Distribution.** Japan: Honshu.

**Habitat.** Leaf and wood litter in oak forest.

**Comments.** This species may be easily distinguished from its congeners, *B. taradakensis* and *B. hisamatsui* excepted, by the angulate tempora, in combination with the shape of the male pedicel. The angulate tempora are possibly a male sexual character. For distinction from the two mentioned species, see their descriptions below.

**Etymology.** The noun “*yari*”, a Japanese spear, refers to the shape of the sclerite of the internal sac.

***Bryaxis taradakensis* sp. n.**

[Japanese name: Taradake-onohige-arizukamushi]

**Holotype** ♂: Mt. Taradake, Japan, Nagasaki Pref., 18.vii.1973, S. Kinoshita leg. (EUMJ).

Length 1.4 mm. Body reddish-brown, elytra slightly lighter, appendages notably lighter than pronotum and abdomen. Pubescence long and semierect on head, pronotum, and elytra, slightly shorter and recumbent, but with several additional long, semierect setae on abdomen. Pronotum with pair of very long lateral setae.

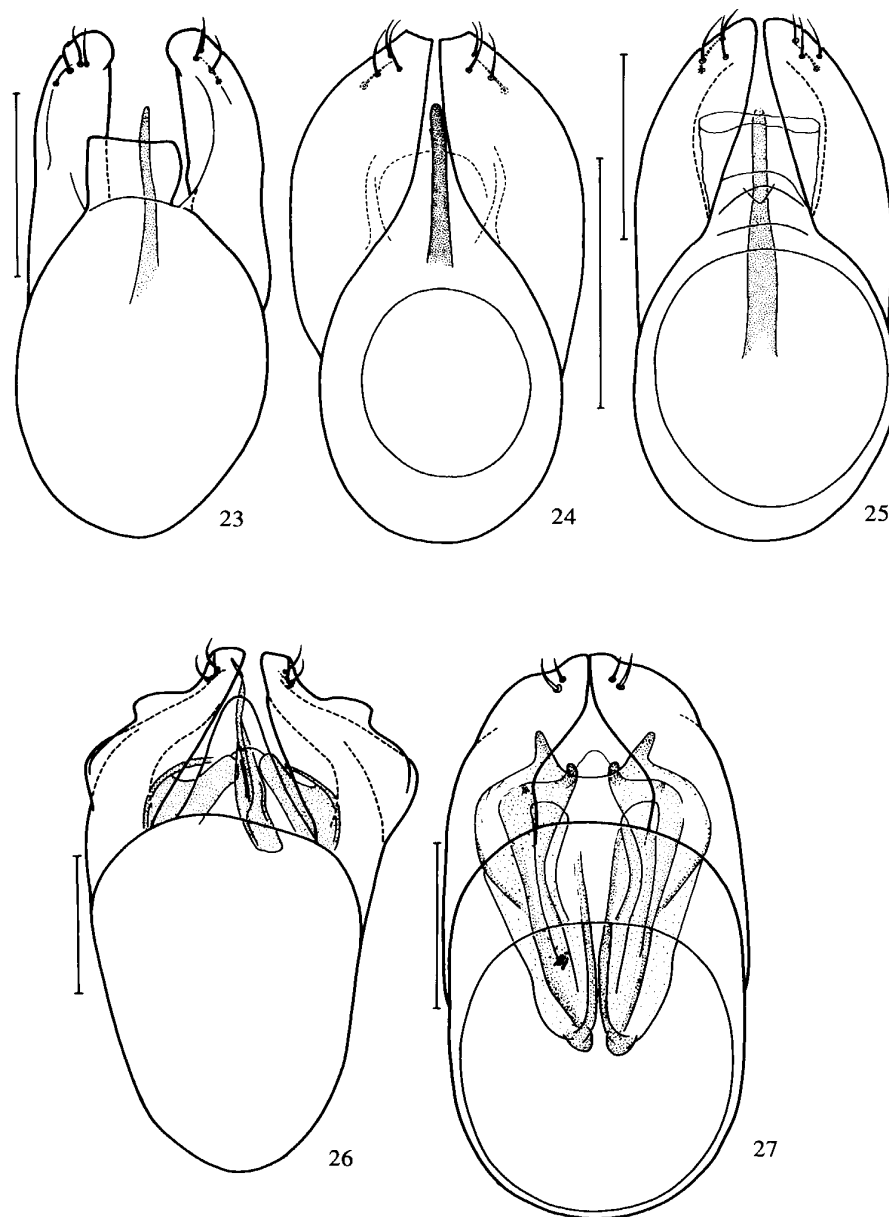
In most principal characters similar to *B. yari*, but differing as follows: head with frontal impression and antennal tubercles impunctate; anterior frontal edge rounded, not well delimited, frontoclypeus not narrowed mesially; vertex convex; eyes larger than in *B. yari*, longer than tempora; pronotum 1.1 times as wide as long, elytra with basal portion of adsutural area conspicuously raised, punctation coarse and dense on humeral protuberances and on basal portion of adsutural area, very fine and sparse on most of discal surface, intervals mostly two to five times as large as puncture diameters. Antennal segment 3 slightly shorter than in *B. yari*, hardly longer than wide.

Metathoracic wings not examined.

Male sexual characters. Tempora angulate. Scape 0.05 mm long, 0.06 mm wide, cylindrical. Pedicel enlarged, 0.11 mm and wide, with inner edge less asymmetrical and more narrowly carinate than in *B. yari*. Aedeagus (Fig. 24) 0.21 mm long. Parameres wide, not inflexed dorsally, gradually narrowed apically, with evenly arcuate outer edges, truncate apices, and straight inner edges near apices; each bearing three dorsal and one ventral subapical setae. Internal sac simple, with single slender, straight rod.

**Distribution.** Japan: Kyushu.

**Habitat.** Unknown.



Figs 23 to 27. Aedeagi in *Bryaxis*. 23. *B. yari*; 24. *B. taradakensis*; 25. *B. hisamatsui*; 26. *B. gracilipalpis*; 27. *B. affinis*. Scale bar = 0.1 mm.

**Comments.** This species differs drastically from *B. yari* and *B. hisamatsui* by the parameres being truncate apically. It may be readily distinguished from all congeners by the strongly raised basal portion of the adsutural area, in combination with the angulate tempora.

**Etymology.** An adjective, referring to the type locality.

***Bryaxis hisamatsui* sp. n.**

[Japanese name: Hisamatsu-onohige-arizukamushi]

**Holotype** ♂: Mt. Ishizuchi, Ishizuchi Nat. Park, Ehime Pref., 13-14.viii.1980, C. Besuchet leg. (MHNG).

**Paratypes:** 8♂, 8♀, same data as for holotype (MHNG, SKCM).

Length 1.35 - 1.40 mm. Body uniformly reddish-brown, appendages lighter. Pubescence fairly long, semierect on head, recumbent on pronotum, elytra, and abdomen. Frons and vertex each with pair of long setae.

In most principal characters agreeing with *B. taradakensis*, but anterior edge of frons well delimited, slightly raised, punctate in middle; inferior edge of frontoclypeus not or hardly prominent; pronotum 1.1 to 1.2 times as wide as long, elytra with adsutural area evenly, slightly raised, elytral punctation even, that of discal surface somewhat less fine than in *B. taradakensis*, with intervals about two to three times as large as puncture diameters, and humeral protuberance and adsutural area not more coarsely punctate than elytral disc.

Metathoracic wings: ♂ macropterous, ♀ micropterous.

Male sexual characters. Scape about 0.05 mm long, hardly wider than long, with rounded anterior side. Pedicel enlarged, 0.07 mm long, 0.09-0.10 mm wide, asymmetrical, most expanded near base. Aedeagus (Fig. 25) 0.28 mm long. Parameres wide, not inflexed dorsally, with evenly arcuate external edges, oblique inner edges, and rounded apices, each bearing three dorsal and one ventral subapical setae. Internal sac simple, with single straight rod narrowed in middle portion, of even thickness in apical third.

Female sexual characters. Scape cylindrical, 0.06 mm long, 0.06-0.07 mm wide. Pedicel asymmetrical, 0.06 mm long, 0.05 mm wide. Tempora rounded. Eyes smaller than in male, shorter than tempora. Genital plate as Fig. 44.

**Distribution.** Japan: Shikoku.

**Habitat.** Moss and leaf litter in *Fagus* forest at 1400m; in bamboo leaf litter at 1700m elevation.

**Comments.** This species may be distinguished from *B. yari* and *B. taradakensis* by the parameres with external edges evenly arcuate, and apices rounded. See also under *B. taradakensis*.

**Etymology.** Named in honour of Dr. S. Hisamatsu, Matsuyama, whose hospitality was greatly appreciated by the senior author during his stay in Shikoku.

***Bryaxis gracilipalpis* Jeannel, 1958**

[Japanese name: Tosa-onohige-arizukamushi]

*Bryaxis (Bythiniama) gracilipalpis* Jeannel, 1958: 90.

**Type material examined:** holotype ♂, Kusaka, Kochi Pref., Japan, 25.viii.1957, H. Coiffait leg. (MNHN).

**Additional material:** 1♂, Fudagô, 180m, Mt. Kiyosumi, Kimitsu City, Chiba Pref., 19.vii.1991, A. Smetana leg., [J1] (MHNG); 1♂, Masaki near Matsuyama, Ehime Pref., 22.vii.1979, M. Sakai leg. (MHNG).

Length 1.35 - 1.55 mm. Body uniformly reddish-brown or abdomen slightly darkened, appendages lighter. Pubescence short, semierect to recumbent on head,

pronotum, and elytra, recumbent on abdomen.

Head with frontal impression densely and coarsely punctate anteriorly, smooth posteriorly. Anterior frontal edge subangulate, not well delimited. Frontoclypeus obliquely inflexed, rounded mesially, slightly prominent below, with inferior edge rounded. Vertex convex, with low median ridge and distinct, impunctate sulci. Tentorial pits at level of anterior eye edge. Antennal tubercles smooth. Punctuation dense and coarse posterior to antennal tubercles and on vertex, except in area between tentorial pits, with intervals formed mostly by narrow ridges. Punctuation sparse between tentorial pits. Eyes prominent, longer than tempora. Tempora rounded.

Maxillary palpi not tuberculate, or second and third segments with extremely low ventral tubercles.

Antennae with segments 3 to 8 evenly wide. Segment 3 slightly longer than wide. Segments 4 to 8 almost evenly large, each wider than long, segment 5 as long as or longer than segments 4 and 6. Segment 9 as long as wide or slightly wider than long. Segment 10 wider than long.

Pronotum 1.05 to 1.10 times as wide as long. Punctuation coarse and dense between antebasal sulcus and base, coarse but irregular on large middle portion of disc, becoming finer laterally. Punctuation very fine on lateral lobes and near anterior pronotal edge.

Elytra without discal impression. Adsutural area not raised. Humeral protuberance distinct. Punctuation dense and relatively coarse, most diameters about as large as or distinctly larger than puncture intervals.

Metathoracic wings: ♂ macropterous, ♀ unknown.

Legs slender.

Male sexual characters. Scape simple, cylindrical in dorsal view, slightly flattened dorsoventrally, 0.05 mm long, 0.07 mm wide. Pedicel enlarged, 0.08-0.09 mm long and wide, asymmetrical, widest in middle. Glandular socle minute, hardly expanded around orifice, situated in small, shallow impression on anterior side at mid-length of pedicel. Protibia slightly curved, with distinct subapical notch and denticle. Metatibia curved in apical half, with distinct apical denticle. Aedeagus (Fig. 26) 0.37-0.40 mm long. Parameres wide, expanded to form two conspicuous lobes, narrowed abruptly toward tip, with apices truncate; subapical lobe well delimited; each paramere bearing three dorsal and one ventral subapical setae. Internal sac with very lightly sclerotized central rods and two conspicuous, strongly sclerotized lateral plates.

**Distribution.** Japan: Shikoku, Honshu.

**Habitat.** Heap of old flood debris in old broad-leaf forest.

**Comments.** The species may be easily distinguished from all its Asian congeners by the unusual shape of the parameres and by the shape of the sclerites of the internal sac.

***Bryaxis humilis* Raffray, 1909**

[Japanese name: Ekubo-onohige-arizukamushi]

*Bryaxis japonica* var. *humilis* Raffray, 1909: 37.

*Bryaxis* (*Bythiniama*) *humilis*; Jeannel, 1958: 91.



*Bryaxis humilis*; Kurbatov, 1994: 46; Nomura, 1996: 118.

**Type material:** lectotype ♂ (by present designation), labelled Kioto/Muséum Paris 1917 Coll. A. Raffray/B. japonica A. Raffray/TYPE/Bythinia humilis R./lectotype label (MNHN).

**Additional material:** see Kurbatov 1994 and Nomura 1996.

Length 1.30-1.45 mm. Body reddish-brown, appendages slightly light. Pubescence short, recumbent.

Head with frontal impression punctate anteriorly, smooth posteriorly. Anterior frontal edge rounded to subangulate, not well delimited. Frontoclypeus oblique, slightly rounded mesially, slightly prominent below, with inferior edge convexly rounded. Vertex convex, without sulci. Median vertexal ridge present but very low, or absent. Tentorial pits at level of anterior eye edge. Antennal tubercles smooth or with a few punctures. Punctuation on vertex and frons coarse and very dense, intervals mostly reduced to form narrow ridges. Eyes prominent, longer than in male or about as long as tempora in female.

Maxillary palpi with segment 2 bearing very low ventral tubercles on apical portion, ventral tubercles on segment 3 more or less distinct.

Antennae with segments 3 to 8 evenly wide, or segments 7 and 8 slightly wider than preceding. Length of segment 3 variable, from less to slightly more than width. Segments 4 to 8 as wide as or wider than long. Segments 9 and 10 wider than long.

Pronotum 1.1 times as wide as long. Punctuation coarse and dense on most of disc, with intervals flat but narrow, lateral lobes finely punctate.

Elytra without discal impression. Adsutural area not raised. Punctuation coarse and dense, intervals smaller or up to two times larger than puncture diameters.

Metathoracic wings: ♂ macropterous, ♀ apterous.

Legs slender.

Male sexual characters. Scape simple, 0.04 mm long, 0.06-0.07 mm wide, with barely rounded posterior edge, distinctly rounded anterior edge. Pedicel enlarged, 0.09-0.10 mm long, 0.08-0.09 mm wide, asymmetrical, impressed dorsally, with glandular socle situated in centre of impression. Glandular socle very short, expanded around orifice. Eyes large. Humeral protuberance distinct. Protibia slightly curved, with very shallow subapical notch, without denticle. Metatibia distinctly curved, with apical denticle. Aedeagus (Fig. 22) 0.40-0.41 mm long. Parameres slender, with slightly sinuate inner and outer edges, converging and narrowed toward abruptly widened apical portions; each with two dorsal and two ventral subapical setae. Internal sac with a pair of slender, strongly sclerotized rods forming complex apical structure.

Female sexual characters. Scape subcylindrical, as short as but slightly narrower than that in male. Pedicel subovoid, almost symmetrical, 0.05-0.06 mm long, about 0.05 mm wide. Eyes smaller than in male. Humeral protuberance absent. Genital plate as in Fig. 47.

**Distribution.** Far East Russia, Japan: Honshu.

**Habitat.** Unknown.

**Comments.** This species may be easily distinguished from all its Japanese congeners by the shape of the parameres.

***Bryaxis affinis*** (Sharp, 1883)  
[Japanese name: Nebuto-onohige-arizukamushi]

*Bythinus affinis* Sharp, 1883: 326.

*Bryaxis* (*Bythobletus*) *affinis*; Jeannel, 1958: 93.

**Type material examined:** holotype ♂ from Nagasaki, 6.vi.1881, G. Lewis (BMNH).

**Additional material:** 1♂, 1♀, Yoshibezawa, 1050m, Kawai-mura, Iwate Pref., 12.viii.1991, A. Smetana leg. [J49], (MHNG).

Length 1.40 - 1.65 mm. Body dark reddish-brown, appendages lighter. Pubescence long, semierect.

Head with frontal impression coarsely punctate anteriorly and smooth posteriorly, or entirely coarsely punctate. Anterior frontal edge fairly well delimited, angulate in middle. Frontoclypeus vertical, narrowed to form obtuse mesial keel, prominent below, with convexly rounded inferior edge. Vertex flattened, without median ridge and without sulci. Tentorial pits level with or slightly posterior of anterior edge of eye. Antennal tubercles smooth. Punctuation on vertex and remaining frontal surface coarse and very dense, punctures mostly separated by narrow ridges. Eyes prominent, about as long as or longer than tempora (in ♂), or shorter than tempora (in ♀). Tempora rounded.

Maxillary palpi with apical portion of second segment and third segment tuberculate ventrally.

Antennae with segments 3 to 8 almost evenly wide. Segment 3 slightly longer than wide. Segments 4 to 8 wider than long, segment 8, or segments 7 and 8, slightly shorter than preceding segments. Segments 9 and 10 wider than long.

Pronotum 1.2 to 1.3 times as wide as long. Punctuation coarse and dense, consisting of uneven punctures about as large as but distinctly sparser than those on vertex. Punctures very fine on lateral lobes.

Elytra without discal impression. Adsutural area slightly raised. Humeral protuberance indistinct. Punctuation very fine anteriorly, becoming coarser posteriorly, fairly dense, intervals mostly about as large but up to twice as large, as puncture diameters.

Metathoracic wings not examined.

Legs fairly stout.

Male sexual characters. Scape enlarged, 0.09 mm long and wide, with posterior side slightly rounded, anterior side distinctly rounded; dorsal impression and glandular socle present. Glandular socle fairly small, oblique, expanded around orifice, situated near anterior scapal edge at apical edge of impressed area. Pedicel simple, about 0.05-0.06 mm long, longer than segment 3, 0.05-0.07 mm wide. Eyes large. Protibia straight, with deep subapical notch and subapical denticle. Metalegs notably stouter than pro- and mesolegs. Metatibia almost straight, narrowed in apical portion, with conspicuously large apical denticle, sinuate inferior side, arcuate superior side. Aedeagus (Fig. 27) 0.34-0.39 mm long. Parameres fairly wide, with outer edges arcuate, sinuate apically, apices rounded, each bearing two dorsal subapical setae. Internal sac with a pair of flat structures strongly sclerotized along edges and ending in blunt denticles.

Female sexual characters. Scape subcylindrical in dorsal view, flattened dorsoventrally, 0.08 mm long, slightly longer than wide. Pedicel 0.05 mm long and wide. Eyes smaller than in male. Genital plate not examined.

**Distribution.** Japan: Honshu, Kyushu.

**Habitat.** Piles of rotten twigs, leaves, and other debris, mostly around bases of large standing trees in predominantly *Fagus* forest.

**Comments.** This species resembles *B. sparsepunctatus*, but may be easily distinguished by the male genital characters.

***Bryaxis sparsepunctatus* Jeannel, 1958**  
[Japanese name: Kobu-onohige-arizukamushi]

*Bryaxis (Bythobletus) sparsepunctatus* Jeannel, 1958: 93.

**Type material:** holotype ♂: Kusaka, Kochi Pref., 25.viii.1957, H. Coiffait leg. (MNHN).

**Additional material** not seen.

Length 1.45 mm. Body reddish-brown, appendages lighter. Pubescence long, erect on head, pronotum, and elytra, semierect on abdomen. Head with two pairs of conspicuously long setae.

Head with frontal impression coarsely punctate anteriorly and in middle, impunctate posteriorly. Anterior frontal edge slightly rounded, well delimited. Frontoclypeus vertical, narrowed mesially to form keel, prominent below, with inferior edge rounded. Vertex convex, without sulci, with extremely low, almost indistinct median ridge. Tentorial pits situated posterior to level of anterior edge of eye. Antennal tubercles punctate except on smooth tip. Punctuation on frons and vertex coarse and very dense, punctures smaller and more dense laterally than in middle, with intervals reduced to narrow ridges. Eyes fairly small, prominent, about as long as tempora. Tempora rounded.

Maxillary palpi with apical portions of second and third segments tuberculate ventrally.

Antennae with segments 3 to 8 evenly wide. Segment 3 as long as wide. Segments 4 to 8 evenly long, segments 4 to 10 wider than long.

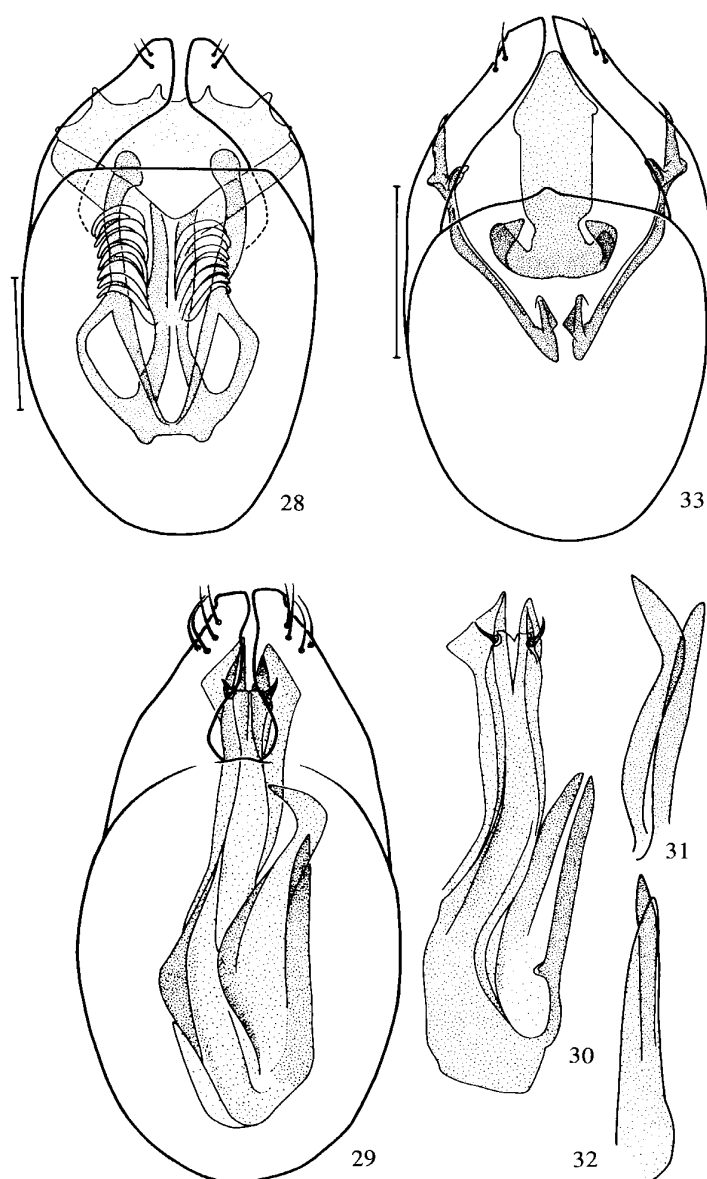
Pronotum 1.25 times as wide as long. Punctuation coarse and very dense between antebasal sulcus and base, mostly coarse and fairly sparse on large central portion of disc, fine on lateral lobes and near anterior pronotal edge. Punctures on middle portion irregularly large, mostly larger than those on lateral lobes, as large as or smaller than intervals.

Elytra without discal impression. Adsutural area not raised. Humeral protuberance indistinct. Punctuation fine and dense, intervals mostly two to three times as large as puncture diameters, larger near base.

Metathoracic wings: ♂ brachypterous, ♀ unknown.

Legs slender.

Male sexual characters. Scape enlarged, 0.08 mm long, 0.09 mm wide, flattened dorsoventrally, with rounded anterior and posterior edges, shallowly impressed dorsally. Glandular socle small, very short, expanded around orifice, situated at edge



Figs 28 to 33. Aedeagi in *Bryaxis*. 28. *B. sparsepunctatus*; 29. *B. koltzei*; 30 to 32. Basal portion of sclerites of internal sac in *B. koltzei*; 33. *B. mayumi*. Scale bar = 0.1 mm.

of dorsal impression at about level of scapal mid-length, nearer to anterior than posterior scapal edge. Pedicel simple, subglobular, about 0.05 mm long, barely wider than long. Protibia almost straight, without subapical notch and denticle. Metatibia curved in apical half, with apical denticle. Aedeagus (Fig. 28) 0.37 mm long. Parameres slender, almost evenly wide, arcuate, with apices narrowed and slightly curved dorsally, each bearing two dorsal subapical setae. Internal sac large, with ventral and dorsal rods joined to form complex structure, rows of lateral lamellae, and wide, apical, denticulate plate.

**Distribution.** Japan: Shikoku.

**Habitat.** In soil.

**Comments.** See under *B. affinis*.

***Bryaxis koltzei* (Reitter, 1887)**

[Japanese name: Ussuri-onohige-arizukamushi]

*Bythinus koltzei* Reitter, 1887:269.

*Bryaxis koltzei*; Löbl, 1973: 325; Kurbatov, 1989: 356; Kurbatov, 1994: 46; Nomura, 1995: 129.

*Bryaxis coreanus* Nomura and Lee, 1992: 70; Nomura and Lee, 1993: 31.

*Bryaxis kintaro kintaro* Nomura, 1995: 130. - syn. n.

*Bryaxis kintaro odaiensis* Nomura, 1995: 134. - syn. n.

**Type material:** not re-examined for the purpose of the present study.

**Additional material:** 1♂, 1♀, Yoshibezawa, 600-700m, Kawai-mura, Iwate Pref., 16.viii.1991, A. Smetana leg. [J57] (MHNG); 1♂, same but 1050m, 12.viii.1991 [J49] (MHNG); 1♂, 4 km SW of Tsumagoi, 1050m, Gunma Pref., 18.vii.1980, I. Löbl leg. (MHNG); 1♂, 1♀, Yaseyûen, Kyoto, Kyoto Pref., 4.viii.1980, C. Besuchet leg. (MHNG); 1♂, Mt. Fuji, 2000-2300m, pref. unknown, H. Franz leg. [Ja 14] (MHNG).

**Distribution.** Russia (Kurbatov 1994), Korea (Löbl 1973; Nomura and Lee 1992, 1993), and Japan: Honshu (see also Nomura 1996).

**Habitat.** Piles of rotten twigs, leaves, and other debris, mostly around bases of old trees in predominantly *Fagus* forest; mixed broad-leaf forest, in moist leaves on rocky slopes and along a creek.

**Comments.** This species was described in detail by Nomura (1992, 1995; as *B. coreanus* and *B. kintaro*, respectively). It may be easily distinguished in both sexes by the shape of the frons and frontoclypeal area, and it has particularly conspicuous male sexual characters. Unique in this species is the presence of a long, stout seta on the male pedicel. The density of the pronotal punctation varies in *B. koltzei*, as in several other species. More striking is the variability of the sclerotized parts of the internal sac. Their shape (Figs 29 to 32) is not correlated with other morphological features, with habitat, or distributional pattern. It varies also among specimens taken around Vladivostok, which are likely members of single population. Thus, *B. coreanus* and *B. kintaro*, which are based on the pronotal punctation and on the shape of the sclerotized structures of the internal sac of the aedeagus, are placed in synonymy of *B. koltzei*. The female genital plate (Fig. 57) is characteristic.

***Bryaxis mayumi* sp. n.**

[Japanese name: Mayumi-onohige-arizukamushi]

**Holotype** ♂: below Usui Pass, 750m, Matsuida-machi, Gunma Pref., 20.vii.1980, I. Löbl leg. (MHNG).

**Paratypes:** 1♀, same data as holotype (MHNG); 1♀, same data but 850m, 24.vii.1980 (MHNG).

Length 1.20 mm. Body reddish-brown, appendages lighter. Pubescence fairly short, semierect on head, pronotum, and elytra, recumbent on abdomen.

Head with frontal impression entirely punctate. Anterior frontal edge straight, well delimited. Frontoclypeus vertical, rounded mesially, slightly prominent below, with inferior edge rounded. Vertex slightly convex, without sulci, with low but distinct median ridge. Tentorial pits posterior to level of anterior edge of eye. Antennal tubercles smooth. Punctuation on vertex and frons coarse and very dense, coarser on median portion than on areas near eyes, with intervals very narrow, mostly formed by ridges. Eyes small, only slightly prominent, shorter than tempora. Tempora rounded.

Maxillary palpi with apical portions of second and third segments tuberculate ventrally.

Antennae with segments 3 to 6 evenly wide, segments 7 and 8 slightly wider. Segment 3 about as long as wide. Segments 4 to 8 each wider than long. Segments 9 and 10 wider than long.

Pronotum 1.2 to 1.3 times as wide as long. Punctuation coarse and dense between antebasal sulcus and base, coarse but sparse and very irregular on large central portion of disc, very fine and dense near anterior pronotal edge and on lateral lobes.

Elytra without discal impression. Adsutural area not raised. Discal impression and humeral protuberance absent. Punctuation fine, fairly dense, with intervals mostly about two to four times as large as puncture diameters.

Metathoracic wings: ♂ not examined, ♀ apterous.

Legs slender.

Male sexual characters. Scape enlarged, 0.08 mm long and wide, asymmetrical, with sharply delimited dorsal impression and bearing a glandular socle. Posterior side slightly but evenly rounded, anterior side strongly asymmetrically rounded. Glandular socle short, broad, expanded around orifice, situated at posterior edge of dorsal impression near anterior scapal edge. Pedicel small, 0.05 mm long, barely longer than wide, simple, with anterior and posterior sides asymmetrical. Protibia almost straight, lacking subapical notch and subapical denticle. Metatibia slightly curved, with minute apical denticle. Aedeagus (Fig. 33) 0.31 mm long. Parameres slender, not inflexed dorsally, evenly wide and arcuate, with oblique apical edge, each bearing two subapical setae. Internal sac with large, flat, central sclerite, transversely oriented and curved dorsally in proximal portion, and with two slender, abruptly angulate, diverging rods inflexed dorsally at basis.

Female sexual characters. Scape cylindrical, 0.06 mm long, slightly longer than wide. Pedicel almost as in male. Eyes slightly smaller than in male. Genital plate as shown in Fig. 48.

**Distribution.** Japan: Honshu.

**Habitat.** Predominantly *Fagus* forest. Piles of rotten twigs, leaves, and other debris around bases of old trees, moist leaf and wood litter in ravine.

**Comments.** This species is unique in the shape of the sclerites of the internal sac of the aedeagus.

**Etymology.** The noun “*mayumi*”, a Japanese bow, refers to the shape of the central sclerite of the internal sac of the aedeagus.

***Bryaxis bushido* sp. n.**

[Japanese name: Bushidô-onohige-arizukamushi]

**Holotype** ♂: Tsuchigoya, 1400m, Ishizuchi Mt. Nat. Park, Ehime Pref., 16.viii.1980, S. and J. Peck leg. (MHNG).

**Paratypes:** 15♂, 34♀, same data as holotype (MHNG, PCSK); 2♂, same but 11-18.viii.1980 (MHNG); 1♀, same but 15.viii.1980 (MHNG); 4♂, 12♀, Mt. Tsutsujo, 1600m, Ishizuchi Mt. Nat. Park, 14.viii.1980, S. and J. Peck leg. (MHNG, PCSK); 1♀, Omogo Valley, 700m, Ishizuchi Mt. Nat. Park, 18-25.viii.1980, S. and J. Peck leg. (MHNG).

Length 1.45-1.55 mm. Body uniformly reddish-brown, appendages lighter. Pubescence short, recumbent. Head and pronotum each with two pairs of long, semierect setae.

Head with frontal impression punctate anteriorly, smooth posteriorly. Anterior frontal edge not well delimited, subangulate or rounded. Frontoclypeus obliquely inflexed, rounded mesially, slightly prominent below, with inferior edge rounded. Vertex convex, lacking median ridge. Vertexal sulci absent, or present as barely impressed oblique lines. Tentorial pits situated posterior to (male) or level with (female) anterior edge of eye. Antennal tubercles smooth. Punctuation irregular on frons and vertex, particularly on middle area of vertex, mostly dense and fairly coarse, but usually fine on lateral portions of vertex. Median portion of vertex sometimes very densely punctate, with intervals formed by narrow ridges. Eyes prominent, longer than tempora (male) or about as long as tempora (female). Tempora rounded.

Maxillary palpi with apical portions of segments 2 and 3 tuberculate ventrally.

Antennae with segment 3 elongate, about 1.4 times as long as wide. Segments 3 to 6 evenly wide, segments 4 to 6 each about as long as wide. Segments 7 and 8 each slightly larger than segments 4 to 6, slightly wider than long. Segments 9 and 10 each wider than long.

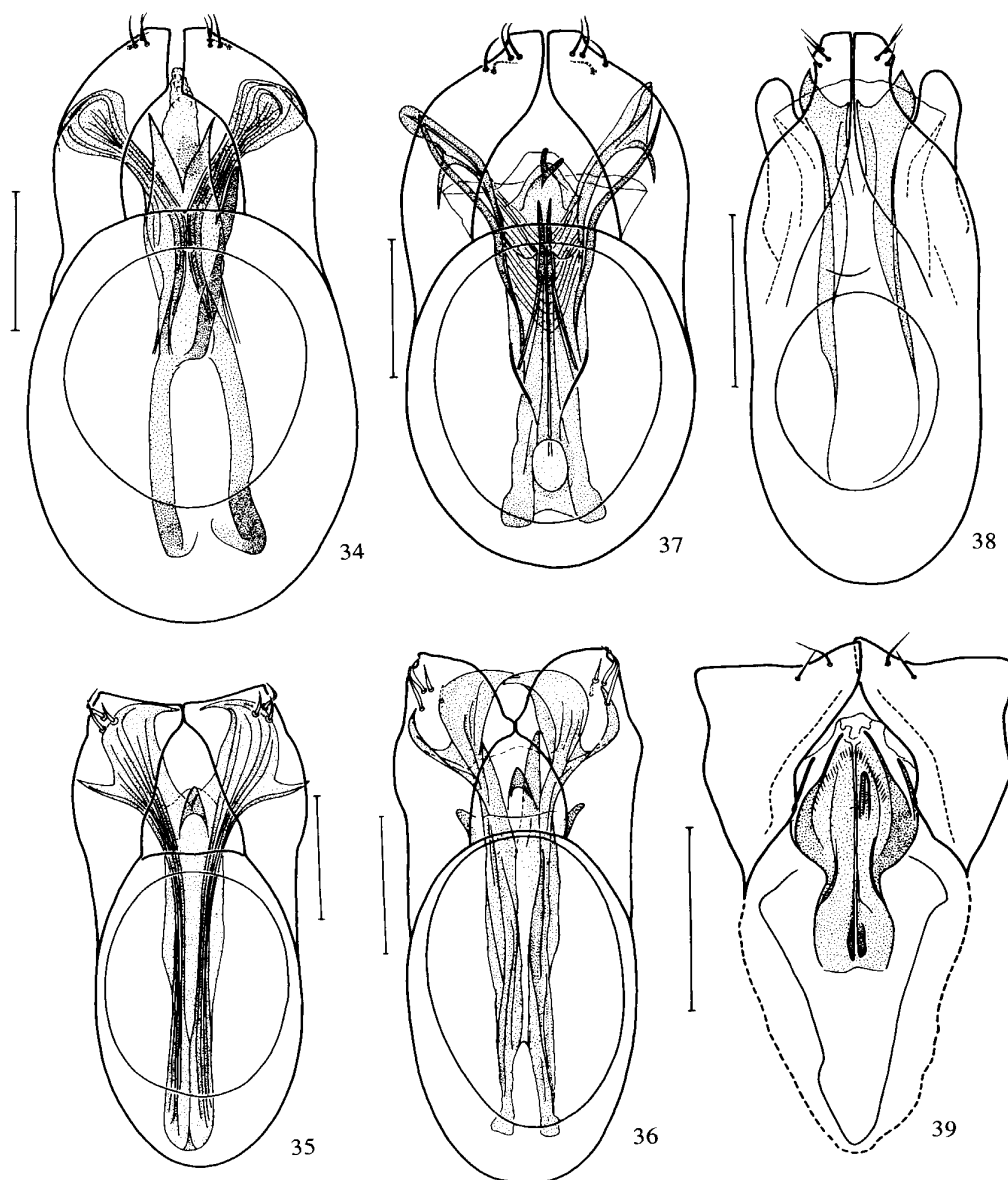
Pronotum almost 1.1 times as wide as long. Punctuation coarse and dense between antebasal sulcus and base, mostly coarse and rather sparse, very irregular on large central area of disc, fine near anterior pronotal edge and on lateral lobes.

Elytra without discal impression. Adsutural area not raised. Punctuation usually dense and fine, with intervals mostly as large or up to three times as large as puncture diameters.

Metathoracic wings: ♂ macropterous, ♀ apterous.

Legs slender.

Male sexual characters. Scape cylindrical, simple, 0.06-0.07 mm long, as long as wide, not flattened dorsoventrally. Pedicel 0.06 mm long, 0.08-0.09 mm wide, asymmetrically expanded and narrowed anteriorly, with very short (0.02-0.03 mm long) marginal carina. Eyes large. Humeral protuberance distinct. Protibia hardly curved, with deep subapical notch and strong subapical denticle. Metatibia slightly curved in apical third, with strong apical denticle. Aedeagus (Fig. 34) 0.40-0.43 mm long. Parameres evenly wide, arcuate, not inflexed dorsally, with apices truncate, inner edges evenly concave, outer edges arcuate, each bearing three dorsal and one ventral setae. Internal sac complicated, with pair of slender, strongly sclerotized basal rods joined with slender central sclerite, two apically pointed laminae, apical



Figs. 34 to 39. Aedeagi in *Bryaxis*. 34. *B. bushido*; 35. Homomorphous *B. extremalis*; 36. *B. reversus*; 37. *B. sumo*; 38. *B. tetralobus*; 39. *B. iriomotensis*. Scale bar = 0.1 mm.

vesicular process bearing minute tubercles, and two conspicuous, apically diverging lamellar structures.

Female sexual characters. Scape as in male. Pedicel asymmetrical, about as long as scape, slightly longer than wide. Eyes smaller than in male. Humeral protuberance absent. Genital plate as shown in Fig. 46.

**Distribution.** Japan: Shikoku.

**Habitat.** In mountains in *Betula-Abies* and *Fagus-Abies* forests, one specimen in warm temperate forest. In log, stump, and moss-fungi litter.

**Comments.** This species may be easily distinguished by the shape of the male



pedicel.

**Etymology.** The noun “*bushido*”, meaning Japanese knighthood, refers to the ability of Jarmila and Stewart B. Peck, who discovered this species, to collect insects under even very difficult circumstances.

***Bryaxis reversus*** (Sharp, 1883)

[Japanese name: Mifushi-onohige-arizukamushi]

*Bythinus reversus* Sharp, 1883: 327.

**Type material examined:** lectotype ♀ (by present designation) and 1 paralectotype ♀ from Nagasaki, 1.vi.1881 (BMNH).

**Additional material:** 2 ♀, Todoroki Valley, Takaki-chō, Nagasaki Pref., 1.vi.1987, S. Nomura leg. (MHNG, NSMT); 1 ♂, 1 ♀, Mt. Iwayasan, Nagasaki City, Nagasaki Pref., 31.v.1987, S. Nomura leg. (NSMT); 1 ♂, Shirakumono-ike, Unzen, Obama-chō, Nagasaki Pref., 19. ix.1993, S. Imasaka leg. (MHNG); 1 ♂, Mt. Haigamine, Kure City, Hiroshima Pref., 28.viii.1988, I. Okamoto leg. (MHNG); 1 ♂, Hase-Kannon, Nara Pref., 30.x.1958, K. Sawada leg. (MHNG); 1 ♂, Mt. Ishizuchi, Ishizuchi Nat. Park, Ehime Pref., 13-14.viii.1980, C. Besuchet leg. (MHNG); 2 ♂, 4 ♀, Yaseyūen, Sakyō-ku, Kyoto City, Kyoto Pref., 4.viii.1980, C. Besuchet leg. (MHNG); 6 ♂, 3 ♀, Seryō Pass, 13 km N of Kyoto, 500-600m, Kyoto Pref., 6.viii.1980, I. Löbl leg. (MHNG); 1 ♀, same but C. Besuchet leg. (MHNG); 1 ♀, Fudagō, 180m, Mt. Kiyosumi, Kimitsu City, Chiba Pref., 19.vii.1991, A. Smetana leg. [J1] (MHNG).

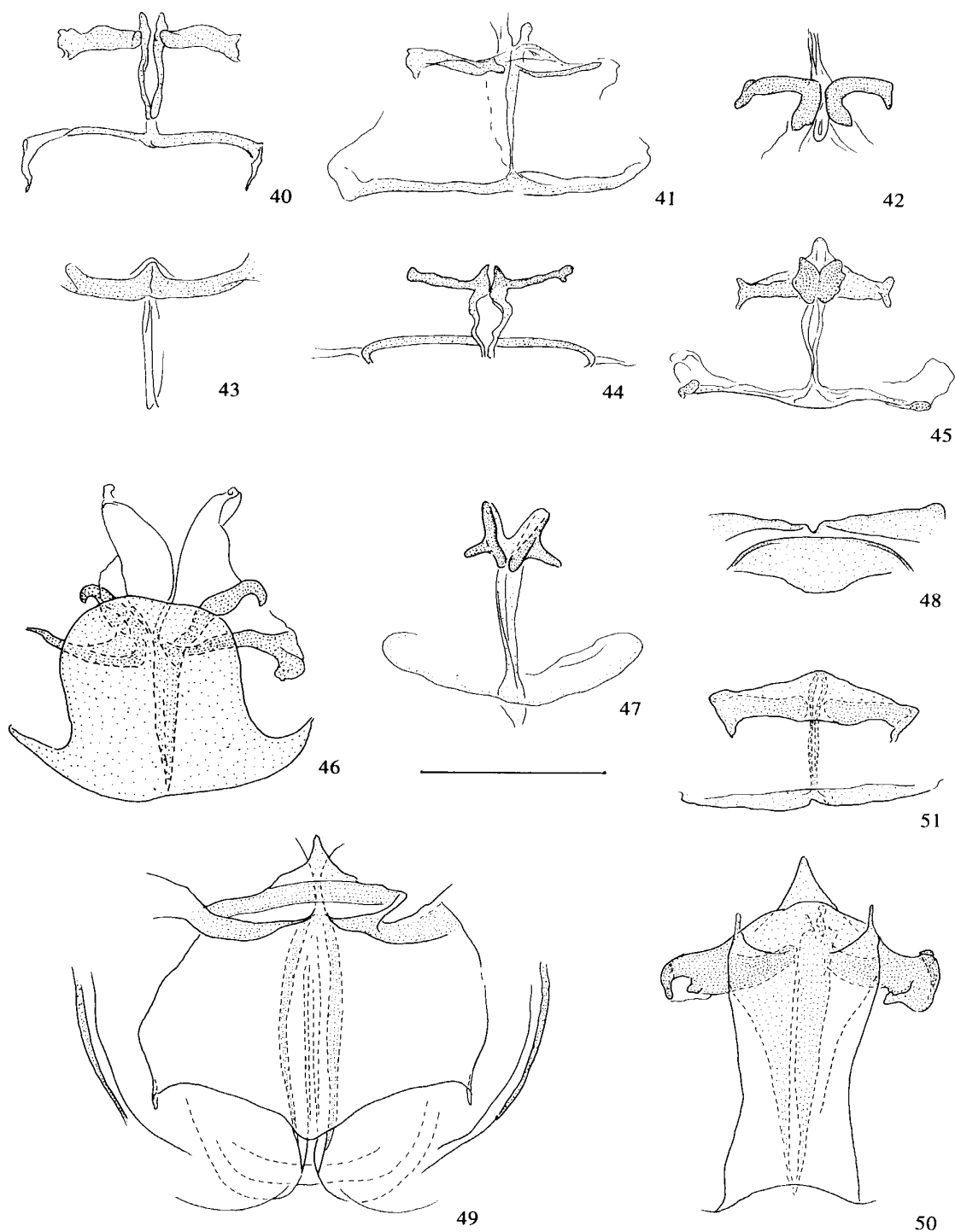
Length 1.65 - 1.90 mm. Body reddish-brown, abdomen sometimes lighter. Appendages usually distinctly lighter than body. Pubescence long, semierect to erect on head, pronotum, and elytra, recumbent on abdomen. Head and pronotum each with two pairs of long setae. Abdomen with several additional erect setae.

Head with frontal impression usually punctate anteriorly and smooth posteriorly, sometimes almost entirely smooth. Anterior frontal edge subangulate, not well delimited. Frontoclypeus vertical, rounded mesially, prominent below, with rounded inferior edge. Vertex slightly convex or flattened, without sulci, sometimes with smooth, barely impressed lines converging toward frontal impression. Median vertexal keel short and very low, or absent. Tentorial pits at about level of anterior edge of eye, or distinctly posterior to this level. Antennal tubercles smooth or with a few punctures. Vertexal and frontal punctation mostly coarse and dense, with punctures separated by narrow ridges. Punctation finer and less dense on lateral portions of vertex, and sometimes also finer on small area posterior to frontal impression. Eyes longer (♂) or slightly shorter (♀) than tempora. Tempora rounded.

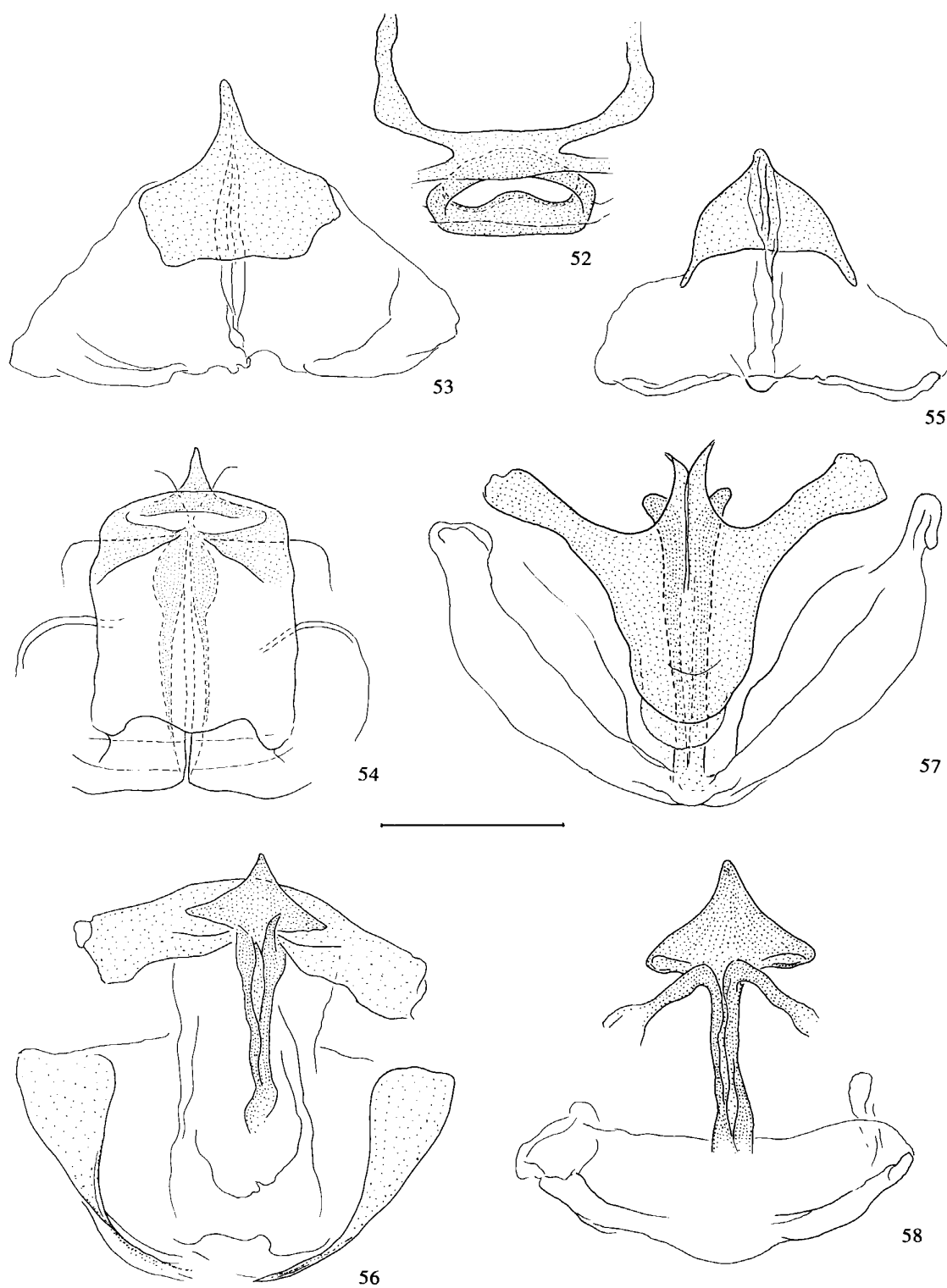
Maxillary palpi without tubercles, or segment 3 with minute ventral tubercles.

Antennae with segment 3 1.3 to 1.5 times as long as wide, about as long as segment 4. Segments 4 to 6 evenly wide, as wide as or slightly narrower than segment 3, segments 4 to 6 barely longer than wide or as long as wide. Segments 7 and 8, or only segment 8, larger than segment 6. Club sexually dimorphic.

Pronotum 1.1 to 1.2 times as wide as long. Punctation coarse and dense between antebasal sulcus and base, highly variable on large central portion of disc, varying



Figs 40 to 51. Female genital plates in *Bryaxis*. 40. *B. frontalis*; 41. *B. coiffaiti*; 42. *B. japonicus*; 43. *B. kofun*; 44. *B. hisamatsui*; 45. *B. kamakura*; 46. *B. bushido*; 47. *B. humilis*; 48. *B. mayumi*; 49. *B. katana*; 50. *B. tanto*; 51. *B. sawadai*. Scale bar = 0.1 mm.



Figs 52 to 58. Female genital plates in *Bryaxis*. 52. *B. heian*; 53. *B. sauteri*; 54. *B. karate*; 55. *B. peckorum*; 56. *B. hoko*; 57. *B. koltzei*; 58. *B. reversus*. Scale bar = 0.1 mm.

from mostly fine to prevailing coarse and similar to that on vertex. Lateral portions of disc finely punctate.

Elytra without discal impression. Adsutural area slightly raised, usually strongly raised near base. Humeral protuberance distinct. Punctuation fine, with intervals mostly three to five times as large as puncture diameters.

Metathoracic wings: ♂ macropterous, ♀ micropterous.

Legs polymorphic, slender in females, slender or stout in males.

Male sexual characters. Scape simple, 0.09-0.12 mm long, 0.06-0.08 mm wide, slightly flattened dorsoventrally, subcylindrical in dorsal view. Pedicel simple, almost symmetrical, suboval, 0.07-0.08 mm long, slightly longer than wide. Antennal segment 9 enlarged, slightly smaller than segment 10, as long as wide or slightly wider than long; segment 10 distinctly wider than long. Eyes large. Humeral protuberance distinct. Protibia straight with shallow subapical notch and small subapical denticle in homomorphous males, slightly curved with deep subapical notch and strong subapical denticle in heteromorphous males. Metatibia curved in apical half in homomorphous males, curved in apical third in heteromorphous males, with variably large apical denticle. Metalegs conspicuously stouter than prolegs and mesolegs in heteromorphous males. Aedeagus (Fig. 36) 0.38-0.44 mm long. Parameres widened apically with apical portion slightly inflexed dorsally, outer edges sinuate, inner edges concave proximally. Parameral apices sharp, expanded mesially to form obtuse subapical teeth; outer apical angle arcuate. Each paramere bearing three dorsal and one ventral subapical setae. Internal sac with pair of moderately sclerotized rods joined basally and widened apically to form curved, bifid lamina; pair of mesial, slender and weakly sclerotized rods; and small central sclerite.

Female sexual characters. Scape and pedicel similar to those in male. Antennal segment 9 smaller than in male, as long as wide or slightly wider than long, segment 10 wider than long. Eyes smaller than in male. Genital plate as shown in Fig. 58.

**Distribution.** Japan: Honshu, Kyushu, Shikoku.

**Habitat.** Leaf litter in oak and old mixed broad-leaf forest, debris along creek.

**Comments.** This species is characterized by having the male antennal segments 9 and 10 strongly enlarged. It may be easily distinguished from its Japanese congeners, *B. extremalis* excepted (see below), by the antennal characters, notably by the simple, long scape and simple pedicel in both sexes.

***Bryaxis extremalis* Kurbatov, 1990**

[Japanese name: Chishima-onohige-arizukamushi]

*Bryaxis extremalis* Kurbatov, 1990: 75; 1994: 46; Nomura 1996: 118.

**Type material:** not re-examined for the present study.

**Additional material:** 1♂, 2♀, Muine Bridge, 600m, Usubetsu, Sapporo City, Hokkaido Pref., 7.viii.1991, A. Smetana leg. [J37] (MHNG); 2♀, Nakayama Pass, 800m, Sapporo City, 26.vii.1991, A. Smetana leg. [J8] (MHNG); 2♀, same but 30.viii.1991, S. Hori leg. (BMNH); 2♂, 3♀, Yoshibezawa, 600-700m, Kawai-mura, Iwate Pref., 16.viii.1991, A. Smetana leg. [J57] (MHNG); 1♂, same but Zaimokuzawa, 15.viii.1991 [J54] (MHNG); 1♂, Meotobuchi, 1180m, Kuriyama-mura, Shioya-gun, Tochigi Pref., 19.viii.1991, A. Smetana leg. [J60] (MHNG); 1♂, 1♀, below Konsei

Pass, 1500m, Nikko Nat. Park, Gunma Pref., 15.vii.1980, I. Löbl leg. (MHNG); 1♂, Mt. Kurofu, 2100m, Joh-Shin-Etsu Kogen Nat. Park, Gunma Pref., 19.vii.1980, I. Löbl leg. (MHNG); 2♀, 8km SE of Osaka, 750m, Osaka-machi, Gifu Pref., 1.vii.1980, A. and Z. Smetana leg. (MHNG); 1♂, same but I. Löbl leg. (MHNG); 3♂, 3♀, Seryô Pass, 13km N of Kyoto, 500-600m, Kyoto Pref., 6.viii.1980 (MHNG); 5♂, 13♀, same but C. Besuchet leg. (MHNG); 1♂, Seryô Pass, 500-700m, Kyoto Pref., 6.viii.1980, A. and Z. Smetana leg. (MHNG); 1♂, Nara Park, Nara Pref., 8.viii.1980, I. Löbl leg. (MHNG).

In most characters very similar to *B. reversus* but smaller, 1.65-1.75 mm long, pubescence moderately long, suberect to recumbent, head and pronotum without longer erect hairs. Elytron with adsutural area not raised near base.

Male genital characters similar to those of *B. reversus*, but aedeagus (Fig. 35) 0.35-0.38 mm long. Parameres widened apically, with sinuate outer and inner edges, truncate apices, and sharp inner and outer apical angles. Internal sac similar to that in *B. reversus* but lacking pair of mesial rods.

Female genital characters. Genital plate similar to that of *B. reversus*, but proximal plate evenly arcuate, not pointed, and two curved lateral sclerites absent.

**Distribution.** Far East Russia, Japan: Hokkaido, Honshu, Shikoku.

**Habitat.** Moist leaf and wood litter in old oak, mixed, and mostly coniferous (*Abies*, *Picea*, with broad-leaf undergrowth) forests; moss and debris around bases of large trees; debris under ferns along a creek; wet leaf litter and other debris lying on a small seepage.

**Comments.** See under *B. reversus*.

### *Bryaxis sumo* sp. n.

[Japanese name: Sumô-onohige-arizukamushi]

**Holotype** ♂: Shiga Kogen, 1500m, Joh-Shin-Etsu Kogen Nat. Park, Nagano Pref., 23.vii.1980, I. Löbl leg. (MHNG).

**Paratypes:** 4♀, same data as holotype (MHNG).

Length 1.60-1.65 mm. Body uniformly reddish-brown, appendages lighter. Pubescence long, semierect to recumbent on head, pronotum, and elytra, recumbent on abdomen. Head with two pairs of conspicuously long, semierect setae.

Head with frontal impression more or less distinctly punctate anteriorly, almost impunctate posteriorly. Anterior frontal edge subangulate, not well delimited. Frontoclypeus vertical, narrowed and rounded mesially, slightly prominent below, with inferior edge rounded. Vertex flattened, with median ridge well developed. Vertexal sulci very shallow, hardly distinct. Tentorial pits posterior to level of anterior eye edge. Antennal tubercles smooth. Punctuation coarse and dense on median portion of vertex and lateral portions of frons, with intervals partly formed by very narrow ridges. Punctuation fine and irregular posterior to tentorial pits. Eyes prominent, longer (in male) or shorter (in female) than tempora. Tempora rounded.

Maxillary palpi with apical portion of second and third segments tuberculate ventrally.

Antennae with segments 3 to 8 evenly wide. Segment 3 about 1.2 times longer than wide. Segments 4 to 8 evenly long, each slightly wider than long, or segments

4 and 5 slightly longer than segment 6 and about as long as wide. Segments 9 and 10 wider than long.

Pronotum 1.05 to 1.10 times as wide as long. Punctuation coarse and dense between antebasal sulcus and base and on large central portion of disc, fine on lateral lobes and near anterior edge.

Elytra without discal impression. Adsutural area not raised. Punctuation fine and sparse, intervals mostly five to eight times as large as puncture diameters.

Metathoracic wings: ♂ not examined, ♀ apterous.

Legs fairly stout.

Male sexual characters. Scape simple, cylindrical, 0.07 mm long, as long as wide. Pedicel enlarged, about 0.08 mm long and large, without glandular socle, symmetrical, with anterior edge entirely carinate. Posterior and anterior edges slightly but evenly arcuate, equally long. Eyes larger. Humeral protuberance distinct. Protibia slightly curved, with deep subapical notch and strong subapical denticle. Aedeagus (Fig. 37) 0.38 mm long. Parameres not incurved dorsally, almost evenly wide, with arcuate outer edges, concave inner edges, truncate apices; each bearing three dorsal and one ventral subapical setae. Internal sac complex, with median rods joined basally, gradually narrowed apically, and with apically diverging, very slender sclerites and pair of lobes; apical portion of internal sac with two asymmetrical denticles.

Female sexual characters. Scape cylindrical, 0.08 mm long, 0.06 mm wide. Pedicel slightly asymmetrical, 0.07 mm long, slightly longer than wide. Eyes small. Humeral protuberance almost indistinct.

**Distribution.** Japan: Honshu.

**Habitat.** *Abies* forest, moist leaf litter on stony slope.

**Comments.** This species may be easily distinguished by the large size of the body in combination with the sexual characters.

**Etymology.** The noun “*sumo*”, traditional Japanese wrestling, refers to the robust characters of this species.

***Bryaxis tetralobus* sp. n.**

[Japanese name: Kaku-onohige-arizukamushi]

**Holotype** ♂: Yoshibezawa, 600-700m, Kawai-mura, Iwate Pref., 16.viii.1991, A. Smetana leg. [J57] (MHNG).

Length 1.6 mm. Body uniformly reddish-brown, appendages lighter. Pubescence long, semierect or erect on head, semierect on pronotum and elytra, recumbent on abdomen.

Head with frontal impression mostly smooth, irregularly punctate anteriorly. Anterior frontal edge rounded, not well delimited. Frontoclypeus almost vertical, rounded mesially, prominent below, with middle of inferior edge truncate. Vertex convex. Median vertexal ridge low posteriorly, interrupted in middle, fairly high anteriorly. Vertexal sulci absent. Antennal tubercles smooth. Punctuation on vertex and frons irregular, mostly coarse and dense, punctures partly separated by narrow ridges or confluent. Eyes prominent, much longer than tempora. Tempora rounded.

Maxillary palpi without tubercles.

Antennae with segment 3 about as long as wide. Segments 4 to 6 evenly large, about as wide as segment 3, each wider than long. Segments 7 and 8 slightly wider than segment 6. Segments 9 and 10 wider than long.

Pronotum 1.1 times as wide as long. Punctuation sparse, shallow, and mostly very fine on disc, very irregular, mostly dense, partly coarse and confluent between antebasal sulcus and base.

Elytra without discal impression. Adsutural area not raised. Punctuation fine and sparse, intervals mostly three to five times as large as puncture diameters.

Metathoracic wings: ♂ macropterous, ♀ unknown.

Pro and mesolegs slender, metalegs fairly stout.

Male sexual characters. Scape simple, cylindrical in dorsal view, flattened dorsoventrally, 0.07 mm long, barely longer than wide. Pedicel enlarged, 0.10 mm long, 0.12 mm wide, asymmetrically expanded anteriorly, widest posterior of mid-length, with short (0.02-0.03 mm) and thick marginal carina. Humeral protuberance scarcely developed. Protibia with weak subapical notch, lacking subapical denticle. Metatibia curved in apical half, with strong apical denticle. Aedeagus (Fig. 38) 0.32 mm long. Parameres not incurved dorsally, widened toward mid-length, narrowed apically, with inner edges subparallel apically, apices truncate, each with large lateral lobe and bearing three dorsal subapical setae. Internal sac with long, flat structure split apically to form two bifid laminae.

**Distribution.** Japan: Honshu.

**Habitat.** Leaves and debris in moist spots along a creek in old broad-leaf forest.

**Comments.** This species may be easily distinguished from its Asian congeners by the shape of the parameres, which bear a large lobe. The male pedicel is similar to but larger than that of *B. bushido*.

**Etymology.** Adjective, referring to the conspicuous shape of the parameres of the aedeagus.

***Bryaxis iriomotensis* sp. n.**

[Japanese name: Iriomote-onohige-arizukamushi]

**Holotype** ♂: Noyashi, Iriomote-Jima, Okinawa Pref., 19.vii.1969, K. Ishikawa leg. (MHNG).

Length 1.2 mm. Body uniformly reddish-brown, appendages lighter. Pubescence long, semierect on head, pronotum, and elytra, recumbent on abdomen.

Head without frontal impression. Antennal tubercles joined by slightly raised area forming smooth transverse portion of frons. Middle of anterior portion of frons conspicuously expanded to form flat, sharply delimited, semi-circular area bearing dense, extremely short, erect setae. Frontoclypeus vertical, flattened, with inferior edge truncate, not prominent (level with superior edge of frons). Vertex flattened, without median ridge and without sulci. Tentorial pits situated anterior to level of anterior edge of eye. Punctuation irregular, mostly dense and fine, becoming coarse toward vertexal mid-line. Eyes small, prominent, shorter than tempora. Tempora rounded.

Maxillary palpi without tubercles.

Antennae with segments 3 to 8 evenly wide. Segment 3 slightly longer than

wide. Segments 4 to 8 evenly long, each wider than long. Segments 9 and 10 wider than long.

Pronotum 1.2 times as wide as long. Punctuation coarse and dense between antebasal sulcus and base, coarse and fairly sparse on large central portion of disc, becoming fine laterally and very fine on lateral lobes.

Elytra without discal impression. Adsutural area slightly raised. Punctuation fine and fairly dense, intervals mostly two to three times as large as puncture diameters.

Metathoracic wings not examined.

Legs slender.

Male sexual characters. Scape simple, conspicuously flattened and smooth dorsally, cylindrical in dorsal view, 0.08 mm long, 0.07 mm wide. Pedicel simple, globular, about 0.05 mm in diameter. Humeral protuberance hardly developed. Aedeagus (Fig. 39) 0.27 mm long. Parameres not incurved dorsally, enlarged apically, with sinuate outer and inner edges, very wide apices, each bearing two dorsal setae. Internal sac with two complex structures rather strongly sclerotized along inner and outer edges and bearing a central rod.

**Distribution.** Japan: Ryukyu archipelago.

**Habitat.** Unknown.

**Comments.** This species appears to be closely related to *B. alishanus* Löbl and Kurbatov, 1996, *B. planifer* Löbl and Kurbatov, 1996, and *B. auritus* Löbl and Kurbatov, 1996, all from Taiwan. It may be easily distinguished by the scape lacking a glabular socle and by the peculiar shape of the frons.

**Etymology.** Adjective, referring to the type locality.

***Bryaxis trichosus* Jeannel, 1958**

[Japanese name: Kebuka-onohige-arizukamushi]

*Bryaxis (Bythobletus) trichosus* Jeannel, 1958: 94.

**Type material:** holotype ♀: Akiyoshi, Yamaguchi Pref., viii. 1957, H. Coiffait leg. (MNHN).

Length 1.35 mm. Body reddish-brown, appendages lighter. Pubescence conspicuously long, erect, or almost erect.

Head with frontal impression entirely coarsely punctate. Anterior frontal edge prominent, angulate, well delimited. Frontoclypeus vertical, narrowed to form sharp mesial keel, not prominent below, with inferior edge rounded. Vertex convex, without sulci, with distinct median ridge. Tentorial pits situated slightly anterior to level of anterior edge of eye. Antennal tubercles smooth. Punctuation on vertex and frons almost evenly coarse and very dense, most punctures separated by narrow ridges. Eyes small, prominent, shorter than tempora.

Maxillary palpi with apical portions of second and third segments tuberculate ventrally.

Antennae with scape flattened dorsoventrally. Segments 3 to 8 evenly wide. Segment 3 slightly longer than wide. Segments 4 to 8 wider than long. Segments 9 and 10 wider than long.

Pronotum 1.3 times as wide as long. Punctuation almost evenly coarse and very



dense, intervals partly formed by narrow ridges.

Elytra without discal impression. Adsutural area slightly raised anteriorly. Humeral protuberance absent. Punctuation relatively coarse and dense, intervals about as large as or up to twice as large as puncture diameters.

Metathoracic wings not examined.

Legs slender.

Female sexual characters. Scape subcylindrical 0.09 mm long, barely longer than wide. Genital plate not examined.

**Distribution.** Japan: Honshu.

**Comment.** *Bryaxis trichosus* may be distinguished from its Japanese congeners in having very long pubescence in combination with the frontoclypeus being narrowed mesially and not prominent below and the entire frontal impression being coarsely punctate.

### Species Inquirendae

#### *Bryaxis grandicollis* Jeannel, 1958

*Bryaxis* (*Bythobletus*) *grandicollis* Jeannel, 1958: 95.

**Type material:** The holotype ♀ from Ryuga, Kochi Pref., 24.viii.1957, H. Coiffait leg. is lost.

A specimen bearing the original locality and type labels of *Bryaxis grandicollis* is a male *Brachygluta fossulata* (without head). Obviously, the type of *B. grandicollis* has been accidentally "replaced". Since the description lacked true diagnostic characters, it seems unlikely ever to be able to associate any species with this name.

#### *Bryaxis subseriatus* (Weise, 1877)

*Bythinus subseriatus* Weise, 1877: 98.

*Bryaxis subseriatus*; Jeannel, 1958: 86.

The location of the type material is unknown. The description is based on specimens from "Oshirojama bei Hagi" [Oshiroyama near Hagi] and lacks detail. The species has been compared to *B. japonicus*, with which it is stated to share the shape of the male antennae. *Bryaxis subseriatus* is described as larger than *B. japonicus*, having the punctuation between the eyes more dense, the pronotum with an impunctate median area and fine admesial puncture rows, the lateral lobes of the pronotum smooth, and the elytra each with a distinct discal impression and a strong humeral protuberance.

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